# Assessment in Action

## *Enhancing and Sharing Vista Software for Understanding Health Issues*

Prepared by the AIA Steering Committee, Clegg & Associates, & Smith-McCann
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# Table of Contents

# *Vista System Evaluation*
# *Assessment in Action Report*

# Executive Summary

## *Background*

Starting in 1991, Public Health – Seattle and King County (PHSKC) began developing Vista to provide their epidemiology and program staff with a user-friendly tool to access timely assessment information on a wide range of public health issues. In its present-day form, Vista is both a web-based, menu-driven user interface and a collection of public health data sets. The program is a rapid, reliable, and interactive data analysis tool, designed to maximize user flexibility. Through a partnership with the Washington State Department of Health (DOH), Vista was disseminated to local health jurisdictions (LHJs) across Washington in 1996 and remains to date the primary software tool used by LHJ staff for community health assessment.

In 2002, the U.S. Centers for Disease Control and Prevention (CDC) awarded funding to DOH to improve community health assessment practice, enhance Vista, and share the Vista tool and partnership model with Oregon State. The first grant year was devoted to evaluating existing systems and developing a four-year work plan for achieving grant goals. The evaluations and work plan development were implemented through a new partnership – called Assessment in Action (AIA) – with Washington's LHJs and the Oregon Department of Human Services, Health Services (DHS). A Steering Committee composed of LHJ and DOH staff directs grant implementation, with guidance and advice provided by a broader Advisory Committee. The Vista Advisory Group also provides input and oversight on the Vista-related aspects of the AIA grant.

As a first step toward enhancing Vista and disseminating the tool to Oregon State, the AIA Steering Committee conducted a comprehensive evaluation of the Vista system that addressed four questions:

- How healthy is the Vista Partnership?
- How can Vista better meet users' needs?
- How well does the software function?
- What does it take to adopt Vista outside Washington State?

The methods, findings, and recommendations from these four components of the Vista system evaluation are summarized below.

# *The Vista Partnership*

In 1996, the Washington State Department of Health (DOH) and 33 Washington Local Health Jurisdictions (LHJs), entered into a partnership with Public Health – Seattle and King County (PHSKC) to disseminate Vista statewide and to provide training and assistance to LHJs in its use. In 2001, Spokane Regional Health District (SRHD) joined the partnership to provide training support to eastern Washington. The goals of the Vista Partnership are to:

- Enhance access to population-based data for local and state assessment staff to use in planning and priority-setting
- Ensure access to standardized public health assessment data, methods and measures across the state.
- Provide maximum flexibility to the user to define time frames, geographic areas and assessment topics so that the information is relevant to local communities.

Vista is a user-governed partnership: LHJs across Washington participate in determining the directions of Vista development and other partnership activities (e.g., training) through the Vista Advisory Group. The Advisory Group meets 2-3 times per year and is comprised of local health Vista users, DOH data suppliers (and users), PHSKC developers, and others. Much of the Advisory Group's work happens between meetings in ad hoc subcommittees, where users and developers collaboratively work through technical and policy issues. Day-to-day oversight occurs in the Vista Planning Group, and is based on a consensus model. Vista has historically been funded through the Public Health Improvement Partnership (PHIP).

## Methodology

As part of a comprehensive evaluation of Vista, the AIA Steering Committee planned an evaluation of the Vista partnership. The goals were to assess the health of the partnership, identify areas of concern, and develop recommendations for strengthening the working relationships that make Vista possible.

Thirteen LHJ and DOH staff involved in the Vista partnership were selected by the AIA Steering Committee to participate in individual qualitative interviews. An external contractor, Smith-McCann, conducted the interviews using an open-ended discussion guide created by the Steering Committee. Audio-recordings of the interviews were transcribed and analyzed for emergent themes by a separate contractor, Clegg and Associates. The findings were framed according to a model for successful partnership.

## Findings

Although the findings point to a healthy collaborative process generally, respondents identified significant challenges to the partnership going forward. These challenges relate primarily to the delineation of roles and expectations, defining the vision for the future direction of Vista and the partnership, and communication processes. Respondents described the relationships and collaborative work done "at the table" as being generally

strong. Conflicts within the larger systems in which the partnership operates, however, drain energy from the partnership and ultimately pose a threat to its sustainability.

- Partnership members have bought into the user-driven process and partnership structure
- There is general agreement about what the partnership's goals are, the degree to which they are being met, and the value of the partnership
- Goals are generally being met, although there is never enough time, staff, or money to do as much as the partners would like to do
- There is a lack of trust within DOH and between DOH and the LHJs regarding members' interests and priorities
- There is a lack of clarity about agency roles, expectations, and conflict resolution processes
- There is a lack of shared vision for the future directions for Vista

# Recommendations

## *Resolve the systemic issues that affect the Partnership*

- Brief DOH and PHSKC upper management on the specific issues impacting the Partnership and enlist their assistance in resolving problems
- Address internal DOH differences regarding the purpose and future of Vista
- Define a clear conflict resolution process for the Partnership
- Institute written agreements that define roles and expectations for Partnership members

## *Improve Vista-related communication within DOH and between DOH and LHJs*

- Determine ways to improve the communication mechanisms currently in place and ensure the communication reaches upper management at DOH
- Increase the transparency of DOH decision-making related to Vista and ensure that Partnership members have a clear understanding of DOH priorities

# *Vista Users' Needs*

The current user community for Vista includes LHJ and DOH staff working in assessment, their designated contractors and community partners, and public health students in Washington. As part of the Vista evaluation, the AIA Steering Committee sought to identify the needs Vista is fulfilling for users and the gaps where needs are not being met. Understanding user needs is essential for guiding the ongoing development and enhancements to Vista. Historically, user input and feedback has been gathered through a biennial survey, Vista Advisory Group meetings, and other mechanisms (e.g., a listserv).

## Methodology

To assess the extent to which Vista users' needs are being met, the AIA Steering Committee used the results of the biennial survey and conducted focus groups. In March 2003, a web-based survey was conducted that queried Vista users about their use of Vista, assessment topics, output, support, and training. Every individual with a current login for Vista was asked to complete the survey; 64% of people with a current login responded. Results were collected and summarized by the Statewide Vista Coordinator.

Additional, in-depth information on user needs was collected through focus groups, carried out in May 2003. Three focus groups, with 6-10 participants in each, were conducted in Everett, Olympia, and Moses Lake. The focus groups were conducted by Smith-McCann, using a discussion guide developed by the AIA Steering Committee. Discussion topics included the Vista interface, data, output, training, ease of use, and unmet needs. Smith-McCann provided a written analysis of the focus group findings. AIA Steering Committee members then combined these findings with the survey results to summarize major themes and recommendations for improving Vista's usefulness to its users.

## Findings and Recommendations

Users stated Vista is fast, reliable, efficient, and easy to use for those with some data analysis background, and performs a critical role for community health assessment. Four major themes for improving Vista emerged from both the survey and the focus groups:

### *Make the data in Vista current and complete*

- Update sub-county population estimates and provide sub-county numerator data
- Develop functionality to analyze sub-county data and custom data sets
- Update reportable conditions to comply with standard DOH definitions
- Add 2000 U.S. Census Data
- Add the functionality to select any ICD code to form customized groupings

## *Enhance Vista output through the creation of new output options*

- Produce more automated options for output, e.g. template for report card, maps, tables, graphs
- List consistent data sources on output
- Have ICD codes displayed on output
- Include links or explanations about all output fields

## *Improve Vista training effectiveness and add training options in related skill areas*

- Consult with DOH Office of Health Promotion and other learning specialists to make training more effective
- Explore partnerships with Focus Area B of Emergency Preparedness and Response Program to conduct basic epidemiology training
- Plan regional trainings that enable participants to produce their own community health status reports

## *Increase the user-friendliness of the Vista interface*

- Make help buttons consistent
- Add hover messages for easy help and click for a more detailed explanation
- Add coaching or prompts to explain steps needed to do analysis
- When software is updated explain what was updated and why

# *Vista Software*

The purpose of this part of the Vista system evaluation was to identify the software's strengths and weaknesses, and to develop recommendations for future enhancement. The AIA Steering Committee and consultants (Smith-McCann) worked collaboratively to establish evaluation criteria. Vista stakeholders (including the Vista Advisory Group, DOH Division of Information Resource Management, Multnomah County Health Department (MultCo), and DHS) were also asked for input on the evaluation criteria. The evaluation was conducted by information technology consultants at Smith-McCann. Results were shared with the stakeholders for comment.

# Methodology

The Vista application was put through a comprehensive review to determine whether it exhibits qualities important to organization mission-critical software (e.g., functionality, ease of use, reliability, performance, and extensibility). The consultants interviewed key staff (e.g., DOH technical support staff, the Statewide Vista Coordinator, PHSKC project manager); reviewed code, databases, and documentation; and attended a user training session to observe system performance.

# Findings

## *Vista should be supported and improved*

- Vista provides vital assessment analyses that are difficult to produce using other products and is valuable to the public health assessment community in Washington

## *Vista has many strengths*

- The application is stable and reliable
- Response time is very good for an application performing complex calculations
- Vista has few, if any, issues with availability (uptime is 24/7)
- The code is in reasonable condition for an application of its age
- Updates are automatically downloaded, keeping the application current for users
- The user interface design is adequate for the tasks it is used for now

### *Weaknesses are primarily in the area of maintainability*

- The structural coherence of the interface component is below an acceptable level
- System documentation is minimal and needs to be completed
- Important, generally accepted industry coding conventions are not being used

### *Other weaknesses could affect wider distribution*

- Microsoft Access is not sufficiently robust for future expansion of Vista
- Some agencies restrict permission to install applications, making updates difficult
- The user interface does not follow current conventions for screen design
- User documentation is incomplete and needs to be updated
- The application-level help and error messaging is inadequate

## Recommendations

### *Functionality*

- Complete the conversion of Vista from the desktop to the web version
- Over time, consider and further evaluate a phased move to the Microsoft .NET environment (supports both "thin" and "fat" client architectures)

### *Ease of Use*

- Evaluate the Vista interface for ways to simplify it and make it more user-friendly (e.g., through the addition of "wizards" to guide users through the construction of a query)
- Update the Vista user manual to reflect changes in the web-based version

### *Reliability*

- Examine the Vista Calculator component to assure full and prompt release of resources
- Perform a security audit of the application and research feasibility of using SSL features

### *Performance*

- Implement regular monitoring of system resources and database usage to assess performance of concurrent usage
- Upgrade the existing server to prepare for wider usage

## *Extensibility*

- Clean up and improve the system's code structure
- Install a test environment and implement testing procedures for software changes

## *Data Components*

- Plan for the eventual conversion of Access databases to SQL Server or similar database management software
- Implement testing procedures for each dataset in Vista

# *Disseminating Vista Outside Washington State*

In November 2001, Multnomah County Health Department (MultCo) in Oregon State contracted with Public Health Seattle and King County (PHSKC) in Washington State to receive Vista. In October 2002, the Washington State Department of Health (DOH) and Oregon Department of Human Services, Health Services (DHS) formed a partnership through the Assessment in Action (AIA) federally funded CDC grant to evaluate the dissemination of Vista in MultCo and transfer Vista to other county health departments in Oregon.

As a first step toward sharing Vista with Oregon State, the AIA Steering Committee evaluated the dissemination of Vista to Multnomah County, Oregon. Factors were identified that contribute to and hinder the successful dissemination of Vista. Knowing these factors will assist in the dissemination of Vista statewide in Oregon and potentially other states and counties.

## Methodology

Key informant interviews were conducted in the Health Research and Assessment unit of the Office of Planning and Development at MultCo and at DHS (e.g., Research and Evaluation Supervisor and Manager of the Health Research and Assessment unit, MultCo. database administrator and the Information Services Coordinator/Public Health Informatics Section Manager at DHS). Two staff at DOH were also consulted: the IT Manager for the Center for Health Statistics (CHS) and the Chief Information Technology Officer for DOH.

The AIA Steering Committee developed the evaluation plan and interview guide. All interviews (except one phone interview) were conducted in-person by the Statewide Vista Coordinator. Questions were asked related to general vision and process to date for disseminating Vista, investment, infrastructure successes and challenges, data and documentation needs, and training (Appendix A).

## Findings

The following are a summary of factors important to the successful dissemination of Vista:

- Educating and communicating in order to build a constituency internally and externally
- Partnering between local health departments and the state to ensure local data needs are met
- Establishing relationships with data providers early on
- Establishing needed data sharing agreements and commitments to providing data in a consistent format over time
- A dedicated staff person with programming and data analysis experience to work on the technical aspects of adopting Vista (e.g. work with data providers around installing and verifying the data)

- Establishing a central person to coordinate policy, training and politics (non-technical aspects of adopting Vista)
- Establishing relationships with local and state IT staff
- Establishing a dedicated secure server for Vista
- Mentoring from DOH and PHSKC to guide dissemination
- Documentation of the dissemination process
- Ensuring consistent population estimates over time
- Creating a formal data verification process
- Defining the users
- Identifying resources to strengthen the infrastructure for making informed decisions at the local level
- Leadership that values community health assessment
- Training around Vista functionality, assessment, epidemiology, and the limitations of the data

# Recommendations

## *Washington*

- Create online Vista training
- Add subcounty data and functionality to Vista
- Have data providers update and validate annual data sets
- Consider partnering with DHS and MultCo around the creation of sub-county population estimates
- Encourage flexible IT infrastructures that meet the needs of people around technology (technology isn't the driving force – peoples needs are)
- Create an automated update for the software engine (dll) so that a complete shutdown and restart of the web server is not required
- Obtain professional design input on the Vista front end to increase user-friendliness
- Continue mentoring and consulting with DHS and MultCo
- Continue to provide updated documentation and software upgrades to DHS and MultCo

## *Oregon*

- Consider partnering with other states and counties around population estimates and creating a reliable process for updating the population estimates statewide annually
- Implement access to birth and death data statewide using Vista
- Create a dedicated staff position at DHS to prepare datasets for community health assessment and work on the technical aspects of adopting Vista statewide
- Create a dedicated staff position at DHS to work on the policy aspects of adopting Vista statewide and improving community health assessment practice
- Formalize a clear and consistent process and commitment – politically and technologically - for updating the Vista databases annually and verifying the data

- Create flexible IT infrastructures that meet the needs of people around technology (technology isn't the driving force – peoples needs are)
- Consider housing Vista on a dedicated secure server (without other applications housed on it)
- Consider collecting information on network and Internet connections statewide (e.g. whether they have a T-1 line), and work collaboratively to improve these connections
- Identify the Vista Users for Oregon
- MultCo provide documentation to DHS on process to date

# The Vista Partnership

### *Keys to Ensuring a Successful Collaboration*

# Introduction

According to Vista Partnership documents, the Washington State Department of Health (DOH) and 33 Washington Local Health Jurisdictions (LHJs) entered into a partnership with Public Health-Seattle and King County (PHSKC) in 1996 to disseminate Vista statewide and to provide training and assistance to LHJs in its use. Vista is a menu-driven software package that allows users with limited computer skills to access and analyze a broad array of public health data. The stated goals of the Vista Partnership are to:

- Enhance access to population-based assessment data for local and state assessment staff to use in planning and priority-setting
- Ensure access to standardized public health assessment data, methods, and measures across the state
- Provide maximum flexibility to the user to define time frames, geographic areas, and assessment topics so that the information is relevant to local communities

The Vista Partnership is described in Partnership documents as a user-governed partnership:

> *"LHJs across Washington participate in determining the directions of Vista development and other partnership activities (e.g., training) through the Vista Advisory Group. The Advisory Group meets twice a year and is comprised of local health Vista users, DOH data suppliers (and users), PHSKC developers, and others. Much of the Advisory Group's work has happened between meetings in ad hoc subcommittees where users and developers collaboratively work through technical and policy issues. Day-to-day decision-making occurs in the Vista Planning Group (PHSKC developers, the DOH Center for Health Statistics Research Manager, the Statewide Vista Coordinator, and the Community Assessment Liaison) and is based on a consensus model."*

Vista is also described as "the longest standing information technology partnership to grow out of Washington's Public Health Improvement Plan."

Vista was first developed by Public Health-Seattle and King County beginning in 1991. PHSKC made the initial investments in Vista. Since 1996, local and state public health systems in Washington have supported the Vista Partnership through Public Health Improvement Plan (PHIP) dollars associated with the Local Capacity Development Fund. PHIP funding has supported software development, hardware and software investments at the local level, training in Vista and related topics (e.g., basic epidemiology), and the Statewide Vista Coordinator position, housed at DOH.

Partnership documents note that the Department of Health has provided considerable in-kind assistance to the Vista Partnership in the form of:

- Work on the part of data providers across the agency to prepare data sets for Vista and provide guidance in their use
- Work on the part of the Director of the Center for Health Statistics (CHS), CHS's Research Manager, CHS's LAN Network Manager, and the Community Assessment Liaison to support the Vista Partnership
- Work on the part of staff in the Division of Information Resources and Management to assist CHS and the Partnership in moving Vista to the web
- Access to a web server within the Center for Health Statistics to house the web version of Vista

Local health jurisdictions have also invested heavily in Vista through staff time to attend trainings, learn the software, and participate on the Advisory Group and its subcommittees. PHSKC has also made substantial in-kind contributions since 1996.

# Methodology

Data collection for this evaluation consisted of 13 interviews with LHJ and DOH staff associated with the Vista Partnership conducted in the spring and early summer of 2003 (Appendix A). The Assessment in Action (AIA) Steering Committee selected the interviewees and designed the open-ended interview guide. Questions focused on several themes:

- Role awareness
- Support for the Partnership (e.g., financial, research, development, technical, data, user, relationships)
- Partnership relationships
- Partnership functionality

Six of those interviewed were LHJ staff, and seven were DOH staff. Those interviewed have various levels of familiarity with Vista and involvement in the Vista Partnership. Some were members of the Vista Planning Group, and some were members of the Vista Advisory Group. Past and current users of Vista were interviewed, as were members of DOH upper management. Twelve of the interviews were conducted by an independent IT consultant; one interview was conducted by Clegg & Associates. Qualitative data analysis was also conducted by Clegg & Associates.

## Methodological Limitations

With the exception of one interview, the interviews were conducted by one external evaluator and were analyzed by another. Each interview was tape-recorded by the interviewer and transcribed by Clegg & Associates. Because of this data collection method, it is possible that the data are not complete. During the tape-recorded interviews conducted by the primary data collection consultant, sensitive topics may not have been captured. Any information conveyed in the interviews that was not captured on tape was lost to the data analyst.

The LHJ participants interviewed were all from larger counties. In addition, not all members of the Vista Partnership were interviewed.

Upper management of Public Health-Seattle and King County was not included in the interviews. A predominant theme in the findings, discussed below, is the relationship between PHSKC and DOH. Members of DOH management were interviewed, but only those PHSKC staff directly associated with the Vista Partnership were interviewed. As a result, it is impossible to determine whether the characterization of the PHSKC-DOH relationship conveyed by DOH staff is shared by PHSKC upper management.

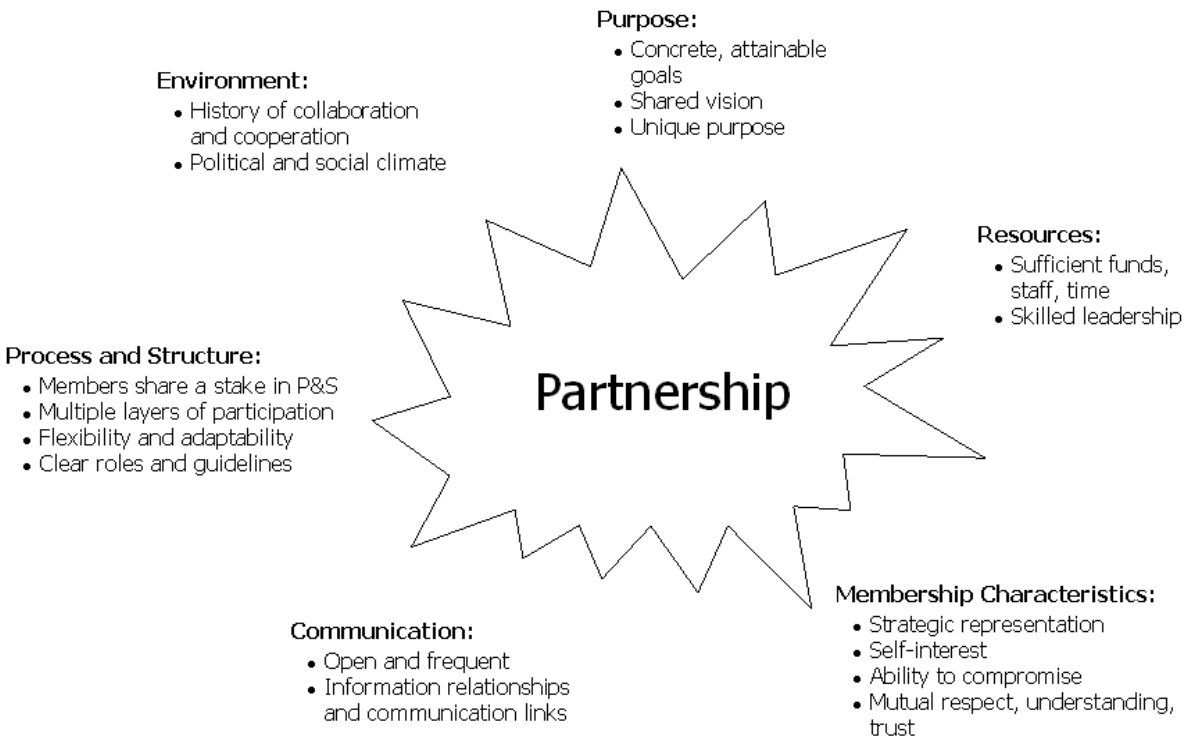
# Findings

In presenting these findings, Clegg & Associates draws upon recent research that identifies a variety of factors that characterize successful collaborations. These factors include the optimal internal and external environments and conditions in which a partnership or collaboration functions. The factors include:

- Purpose
- Resources
- Membership characteristics
- Communication
- Process and structure
- Environment

The model shown below delineates these factors and includes a list of conditions relating to each factor. Following are findings from the interviews that relate to each factor.

# Factors Influencing the Success of Collaboration*




* Excerpted from *Collaboration: What Makes It Work*, Paul Mattessich, Marta Murray-Close, Barbara Monsey. Amherst H. Research Foundation. May 2001.

*Clegg & Associates*

Although the findings point to a healthy collaborative process generally, respondents identified significant challenges to the Partnership going forward. These challenges relate primarily to the delineation of roles and expectations, defining the vision for the future direction of Vista and the Partnership, and communication processes. As discussed below, respondents described the relationships and collaborative work done "at the table" as being generally strong. Conflicts within the larger systems in which the Partnership operates, however, drain energy from the Partnership and ultimately pose a threat to its sustainability. The recommendations presented by Clegg & Associates to the AIA Steering Committee that appear at the end of this report seek to address these broader systemic challenges.

## Purpose

Research indicates that the conditions needed to support a clear collaborative purpose include:

- Concrete, attainable goals
- Shared vision
- Unique purpose

Conclusions from the interview findings relating to each of these conditions are shown below, followed by detailed supporting information drawn from the interviews.

### *There is general agreement about what the Partnership's goals are, the degree to which they are being met, and the power of what the Partnership can achieve.*

Those interviewed collectively described the goal of the Vista Partnership as supporting and maintaining Vista as a flexible tool to help local health jurisdictions have ready access to timely, easy-to-use, quality data, thereby enabling them to conduct community health assessment and meet the public health standards. Respondents consistently stated that the Partnership is driven by the needs of the local health jurisdictions. One individual described the Partnership as working to "democratize data" through a shared collaborative process. Others echoed this sentiment, noting that the goals for Vista and for the Vista Partnership are set *through* the work of the Partnership – developers, data suppliers, trainers, and users are engaged together around a common goal. Respondents described this as one of the primary strengths of the Partnership.

### *Goals are generally being met, although there is never enough time, staff, or money to do as much as the partners would like to do.*

There was general consensus among those interviewed that all partners are working to make Vista a better tool for local health jurisdictions. All partners support the need for local health jurisdictions to have access to easy-to-use, quality data to support their community health assessment work, and they feel they are doing their best to support this work. Partners, however, feel constrained by time, staff, and funding. They face multiple demands on their time, which make it difficult to do everything they would like to do to support the Partnership or to improve the functionality of Vista. Several individuals stated that the Partnership would benefit from additional funding and staff.

## *The Partnership makes things happen*

Those interviewed agreed that the great value of the Vista Partnership is that it brings the people who designed Vista, the people who make it useable, and the people who use it together to discuss and resolve community health assessment issues. Through the Partnership, members work together towards the same end, addressing statewide public health issues. Nearly all of those interviewed stated that the great benefit of the Partnership is that it results in standardized data. Vista enables all local health jurisdictions and DOH to have access to the same health data, thereby improving the credibility of public health statewide and ensuring that public health data is of the highest quality. As one respondent stated, Vista "builds trust in government."

Partners recognize that, through the Partnership, all partners are able to achieve more together than they would be able to achieve alone. As one respondent stated, there is a risk involved in bringing these disparate groups to the table – all parties need to be willing to relinquish a certain amount of control over the process and the product in order to engage in the collaborative process. Yet all parties have taken and continue to take this risk. This person concluded that there have been many commitments made and kept to sustain the Partnership over a long period of time. Because of this commitment, Washington is unique in the degree to which it makes data available to the user population. Several other partners, particularly those LHJ representatives interviewed, noted that the Partnership builds capacity and relationships throughout the state. By expanding the network and perspective of public health professionals through the Partnership, community health assessment practice has improved statewide.

## *There are caveats…*

Several individuals stated their belief that the clarity of purpose, commitment to common goals, and/or capacity to achieve the Partnership's goals have eroded or are eroding. A few individuals suspect that the goals of the Partnership are not clear to all Partnership members and/or that there have been efforts to alter the goals of the Partnership or the goals for Vista outside of a group process. (More on this issue follows below.) There is also a suspicion that some DOH representatives who have joined the Partnership in recent years have not bought into the Partnership vision for Vista.

A few respondents also noted that there has been some erosion in the ability to meet the goals of the Partnership due to flat funding in recent years, inadequate staffing levels, and shifting priorities relating to community health assessment in general. The vitality of the Partnership and its ability to meet its goals are, therefore, affected by some factors that are external to the Partnership itself.

### *There is a lack of shared vision for the future directions for Vista*

There are some differences in vision that relate to desired improvements to VistaPHw, the web-based version of Vista, as a tool and some differences that relate to perceived conflicts in priorities and interests within DOH and between DOH and the LHJs. In regard to desired improvements to Vista, the range of possible improvements noted by respondents includes the following:

- Expand the data sources available in Vista by incorporating other state agency or program data (e.g., DSHS programs, tobacco program)
- Provide geocoded data
- Refine the web-based functionality of Vista
- Enhance VistaPHw functionality through graphics, reports, and mapping capabilities
- Provide better and more training for Vista
- Provide public access to the data contained in Vista

The issue of public access to data was raised by a few individuals. While a couple of these individuals supported making data publicly available, the others feared that, without adequate training in data interpretation and without the public health context in which data are presented, public misinterpretation of the data would be possible, thereby resulting in decreased credibility of the public health system and a general deterioration in the quality of public health data. There is some fear, primarily on the part of LHJ representatives, that LHJ assessment staff would be left to deal with the challenge of correcting public misunderstanding if such data were made widely available, which would consume much time and effort.

In regard to training, one respondent noted that the quality and availability of Vista-related training has eroded over the years. This erosion was attributed to factors that are both internal and external to the Partnership. Training has been supported primarily through in-kind investment, and partners have not been as willing to make such investments. A couple of those interviewed did point to the training role that Spokane has taken on: "What a wonderful idea it was to do the training broker kind of thing with Spokane." This was described as a positive development, contributing new energy to the Partnership dynamics.

In contrast to most respondents who identified at least one desired area of improvement in Vista, one individual stated that the Partnership should merely focus on maintaining the quality and scope of data that it currently contains rather than integrating additional data sources or functionalities.

The concern that conflicting priorities and interests within DOH and between DOH and the LHJs may derail the Vista Partnership vision related primarily to a perceived struggle over the primacy of one of two data systems: Vista or a DOH-designed system, EpiQMS. The Vista vs. EpiQMS controversy appears to be, in many ways, symptomatic of broader issues – some of which are external to the Vista Partnership – that are described in further detail below, including a lack of clarity about how and when funding and policy decisions relating to Vista are made by DOH, whether the Vista Partnership is indeed characterized by a collaborative decision-making process or if important decisions bearing on the future of Vista are made outside of the Partnership, poor communication channels and practices within DOH and between DOH and the LHJs, and what was described by some DOH staff

as a "turf battle" between PHSKC and DOH. These issues will be addressed throughout this report.

## Resources

The resources needed to support healthy collaborative processes include:

- Sufficient funds, staff, and time
- Skilled leadership

In regard to the Partnership's resources, the following conclusions emerged from the interviews:

### *There is a lack of sufficient funds, staff, and time*

A common theme among those interviewed is a lack of stable and adequate funding to support Vista and the Partnership. Funding has been fairly flat, meaning that, over time, resources diminish. There is never enough time and money to make the system improvements that the Partnership would like to make or to make them as quickly as the Partnership would like to make them.

Those interviewed recognize the value of the Statewide Vista Coordinator position, but some believe the investment in such support for Vista does not match the level of support made in other states. A few respondents, however, noted that much of the work of the Partnership is achieved through in-kind contributions, which may end up being comparable to the FTE investment made in other states.

### *There is a lack of certainty about how and when funding decisions are made*

This lack of certainty about DOH funding processes was expressed by several individuals. The funding issue appears to be linked to two related issues:

- Communication channels within DOH and between DOH and the LHJs
- DOH support for Vista vs. EpiQMS

Several respondents stated that the processes by which funding decisions are made within DOH – who makes decisions, when decisions are made, and how decisions are made – are not communicated throughout the ranks of DOH and between DOH and the LHJs. The result is a heightened sense of anxiety among LHJ and some DOH staff about the sustainability of Vista and the Partnership and doubts about the commitment of DOH upper management to Vista and the Partnership.

The lack of clarity regarding the intentions of DOH upper management for Vista vs. EpiQMS increases these doubts. Several individuals stated their fear that DOH upper management will eventually reduce financial support to Vista and shift resources to the development of EpiQMS. Some expect that a perceived lack of DOH commitment and support for Vista will show up in funding.

### *Leadership is unclear*

Although there is consensus that the Partnership is driven by the needs of the LHJs through a collaborative decision-making process, DOH and PHSKC play key roles as developers of and data suppliers to Vista. The question of Partnership leadership roles relates to other issues pertaining to Partnership roles and expectations broadly defined, communication processes, and the future vision for Vista and the Partnership. Leadership and management roles do not appear to be clearly defined. As one respondent questioned, "Is it [Vista] getting adequate management and oversight or does it live in a nether world between two agencies and it doesn't have a real boss?"

Many of the comments regarding the leadership, management, or control of Vista and the Partnership related to DOH-PHSKC relationship. It is notable that all such comments derived from DOH staff. In this regard, it is important to remember that upper management of Public Health-Seattle and King County was not included in the interviews. It is, therefore, unclear whether the characterization of the PHSKC-DOH relationship conveyed by DOH staff is shared by PHSKC upper management.

The "turf battle" between DOH and PHSKC was described as souring what is otherwise perceived as a fairly strong and well-functioning partnership. As the developers and data suppliers to the system, however, this relationship is a key one. As the developers of Vista, both LHJ and DOH respondents noted that PHSKC is invested in Vista – PHSKC will continue to support and make improvements to Vista because Vista meets its needs. In contrast, EpiQMS is a DOH-created data system. This conflict between dueling data systems was described as a control or ownership struggle between DOH and PHSKC. Who will provide leadership around the data systems issue and how that leadership will be provided is undefined.

Respondents suggested that DOH upper management has not done enough to either support Vista or resolve issues relating to its future. Because of competing demands on DOH managers' time, management of the Partnership has largely been left to those directly involved in the Partnership. In other words, those interviewed described a fairly "hands off" approach adopted by DOH upper management. At the same time, however, DOH makes decisions external to the Partnership that bear directly on the future of Vista, whether related to funding, the future support for Vista vs. EpiQMS, or the data sets that will be supplied to the system. The "hands off" approach, combined with lack of clarity around other DOH decision-making processes, appears to feed the perception of a lack of support and interest in Vista on the part of DOH management. Respondents noted a lack of DOH management willingness or ability to step forward, resolve interagency-level and staff-level conflict, define interagency roles, and set broader policies regarding the collaborative process.

## Membership Characteristics

Membership characteristics that have been identified by research as defining strong partnerships include:

- Strategic representation
- Self-interest
- Ability to compromise
- Mutual respect, understanding, and trust

In regard to the Vista Partnership's membership characteristics, the interviews pointed to the following findings:

### *The Partnership is comprised of highly dedicated, skilled, and passionate people with strong personalities*

Nearly all of those interviewed noted that the Partnership is defined by its personalities and its relationships. The Planning and Advisory Groups, in particular, are comprised of highly skilled, dedicated, and passionate people who set the tone for the Partnership. They are invested in the process and the product. They are dedicated to making things work for those who need to use the product.

A few of those interviewed, although crediting the good work done by DOH and LHJ staff in support of Vista, described the passion around Vista and the Partnership as a double-edged sword. The relationships among Partnership members and the personal attachments to Vista are perceived as skewing objective appraisals of Vista. As one individual stated, "it is a product," a tool that should be reviewed, assessed, and revised over time in light of new technological developments. With passionate and strong personalities comes the potential for conflict as well. Without processes to resolve conflicts, the Partnership – and data quality – can and, in the opinion of some, has suffered.

### *All participants recognize the value of the Partnership and have an interest in being at the table, but there are differing priorities and interests and a general lack of mutual understanding*

As described above, all respondents noted that the Partnership enables the partners to achieve more together on behalf of public health than they would otherwise be able to achieve alone. They, therefore, have a clear interest in the Partnership and its work.

Several respondents, however, described a lack of mutual understanding between DOH and the LHJs and the existence of differing priorities and interests, particularly between DOH and PHSKC. Some of this sentiment is likely typical of state and local governmental relationships generally – local entities perceive that state agencies do not adequately understand their needs while state agencies feel that local agencies do not understand the demands and priorities they must contend with from state executives, state legislatures, and federal agencies. As one individual stated, "We don't really understand where each is coming from…. I don't really know the actual things they may be facing, and I don't think they see what we're facing either." This lack of mutual understanding appears to have a direct consequence in regard to Partnership functionality; a few respondents stated that they

sometimes feel that they are being asked to do too much and that there is little appreciation for what they do bring to the Partnership.

Several respondents also pointed to conflicting interests and priorities that characterize the relationship between DOH and the LHJs, particularly the relationship between DOH and PHSKC. For example, the subject of subcounty data arose repeatedly in regard to DOH vs. LHJ priorities. LHJ respondents were consistent in characterizing subcounty data as being critical to their ability to conduct community health assessment, a view they did not see as being shared by some DOH staff. They expressed a great deal of frustration with DOH decision-making around which data are made available to Vista.

In regard to DOH and PHSKC priorities, the Vista vs. EpiQMS issue arose frequently. One individual expressed some concern on the part of DOH about PHSKC's future plans for Vista – whether or the degree to which PHSKC would "market" Vista to other states and what this might mean for power relationships within the Partnership. Several respondents expressed the concern that DOH is shifting its focus away from community health assessment generally and from Vista as a tool and towards EpiQMS. As stated above, respondents also recognized that PHSKC is invested and will likely continue to be invested in Vista to do its own work. While PHSKC support to Vista and the Partnership is recognized as a key to success, the ability of PHSKC to work independently, if needed, causes LHJs to feel somewhat isolated, according to one respondent. PHSKC is perceived as having greater capacity to resolve assessment data issues alone than do other LHJs. For example, with regard to subcounty data, PHSKC has a greater ability to do what it needs to do to generate subcounty data, with or without the Partnership. Without the Partnership and support from DOH, other LHJs are unlikely to be able to have such data to support their work.

### *There is a lack of trust within DOH and between DOH and the LHJs*

Such conflicting interests and priorities, combined with lapses in communication and transparency in decision-making, have resulted in what one respondent described as "undercurrents of a lot of mistrust." A lack of trust between DOH and PHSKC was described as resulting from historic political battles that are external to the Partnership. Tension also exists between the two agencies because of the size of PHSKC in relation to DOH and the fact that PHSKC competes with DOH for staff and resources. Mistrust also derives from the questions about DOH funding and support for Vista and its future plans for EpiQMS. Unlike Vista, the development of which has been closely tied to the LHJs and driven by local needs, EpiQMS is seen as being developed by a small number of people at DOH, outside of local processes, and without LHJ input. LHJ respondents expressed concern that EpiQMS will be foisted upon the LHJs, leaving them with a data system that is not responsive to their needs and for which they have received no training. As one respondent stated, "It's kind of stupid that we're fulfilling a state standard that they implemented for local health and we have to fight them to do it."

While respondents described the lack of trust that pervades interagency relationships, they also spoke of the mutual respect and trust "at the table." The relationships among members of the Planning and Advisory Groups and among the LHJs were generally described as being characterized by a great deal of respect, trust, and equity. As one respondent stated, "Everyone's treated the same in the room when we're there." It appears to be the processes that go on external to these groups, but among Partnership members, that create challenges for successful collaboration.

## Communication

Healthy collaborations tend to be characterized by the following communication practices:

- Open and frequent communication
- Informal relationships and communication links

Interview findings relating to communication include the following themes:

### *There is generally good communication at the table*

Respondents stated that communication is frequent and open among Planning and Advisory Group members. As noted above, respondents described the Partnership membership as being a collection of strong personalities. As such, they tend to speak up and say what is on their minds. Typical challenges, such as those posed by geographic distance, exist, but those interviewed stated their belief that communication practices among those directly involved in the Partnership are strong. They particularly noted the role of the Statewide Vista Coordinator in ensuring that all members remain informed.

### *The Partnership has created and strengthened informal communication and relationships among LHJs and between LHJs and DOH*

LHJ respondents in particular noted the positive relationships that have been established through the Partnership. The Partnership has helped create camaraderie among those working in public health and has made the state "feel smaller." LHJ staff have increased confidence in their ability to call upon staff at DOH and other LHJs for assistance or information because of the relationships established through the Partnership. According to one individual, strong relationships have resulted in better data quality.

### *Without mutual trust, open communication is a challenge*

In contrast, weak relationships result in poor communication which impedes quality data. In this regard, the lack of trust that exists within DOH and between DOH and the LHJs around a number of issues hinders quality communication. One respondent stated, "I think there are some definite cracks in our communication and in our trust." A couple individuals noted that a few Partnership members are less communicative than others – some members do not speak up, keeping differences of opinion or perspective bottled up until they reach their breaking point. In addition, the perceived lack of mutual understanding can play out in communication; one respondent felt that interests of particular Partnership members are not always heard or understood. Another individual noted that the Partnership always needs to be vigilant about the possibility of diminishing voices.

### *The lack of decision-making authority on the part of DOH representatives impedes communication*

Several individuals spoke of a lack of follow through on the part of DOH Partnership members. They did not necessarily attribute this to any fault of individual members but rather to the lack of decision-making authority on the part of DOH representatives. DOH staff were described as frequently needing to "check back" with DOH management on various issues. In the past, the results of the "check back" process have not subsequently been conveyed to Partnership members by the DOH representative. Rather, decisions relative to the issue at hand that have been made by DOH upper management have been

conveyed via email with little or no explanation as to why or how a particular decision was made. Other Partnership members find this to be frustrating and disappointing. They surmised that if DOH representatives "at the table" had greater decision-making authority and did not need to "check back" with DOH management, communication and trust would be improved.

### *The reliance on email can be onerous*

Several respondents made comments about the reliance on email as a communication tool. The amount of email generated was described as "endless and draining." One respondent noted that, because LHJ staff in particular highly value the Partnership's relationships and communication processes, they often click on "Reply All" to emails from the Statewide Vista Coordinator. The result is a deluge of email that other Partnership members have difficulty processing. They give up trying to process it and do not respond, which, they fear, feeds the view that they are unresponsive or unsupportive of Vista and the Partnership.

## Process and Structure

Factors relating to process and structure that support successful collaborative processes include:

- Members share a stake in process and structure
- Multiple layers of participation
- Flexibility and adaptability
- Clear roles and guidelines

In regard to the Partnership's process and structure, the interviews pointed to the following findings:

### *Partnership members have bought into the process and Partnership structure*

Those interviewed described the Partnership as being governed through a collaborative process that supports community health assessment and the work of the LHJs. Respondents were consistent in stating that the Partnership enables partners to do more together than they would be able to do alone. Communication and relationships are generally strong, particularly among Planning and Advisory Group members. Partners have been able to accomplish much over the years on behalf of public health and community health assessment through the collaborative process.

### *The Partnership's approach is flexible and adaptable*

According to respondents, the Partnership is unique in the degree to which it is user-driven, and it has consistently been responsive to meeting local needs when making improvements to Vista. Decision-making within the Planning and Advisory Groups is collaborative with a focus on improving data quality and community health assessment practice statewide. As one individual stated, "They really listen and things get done to the best of their ability."

### *Multiple layers of participation exist*

As stated above, respondents described the inclusion of users, data suppliers, developers, and trainers at the table to address community health assessment issues as a key strength of the Partnership. In this sense, multiple layers of participation are a positive factor. The comments relating to the level of participation by DOH upper management, however, also suggest that it can be something of a detriment as currently structured. Although not directly involved in the Partnership, decisions and policies made by DOH management bear directly on the work of the Partnership. Without trust, strong communication channels, transparency, and conflict resolution processes, these multiple layers of participation pose challenges to the effectiveness of the Partnership.

### *There is a lack of clarity about agency roles, expectations, and conflict resolution processes*

The roles of Partnership members are clear in theory: PHSKC oversees issues related to the development of Vista and contributes in-kind support, DOH supplies data to Vista and provides financial and coordination support, Spokane LHJ is a training partner, and the other LHJs participate in decision-making through the Partnership and provide in-kind support. Interview data, however, reveal that, in practice, agency roles and expectations are not nearly as clear.

At the heart of the role definition and conflict resolution issue is the relationship between DOH and PHSKC and the lack of clarity about the DOH vision for the future of Vista. Several DOH staff interviewed spoke of the perceived imbalance or "turf battle" between DOH and PHSKC. One individual stated that there are mutual questions regarding the amount of authority and control they respectively have and resentment on one side or the other about "being told what to do."

Apart from what were described are broader and historic conflicts between DOH and PHSKC that are external to the Partnership, the nature of the respective Partnership roles of PHSKC and DOH can also be problematic. As designer and developer of Vista, PHSKC is invested in Vista and will continue to make improvements to it in order to support its own needs, as well as those of others. As data supplier, DOH has a great deal of latitude in determining what data will be supplied to the system. DOH's ability to make decisions about what data will or will not be supplied to the system generates a great deal of resentment on the part of LHJs who believe that they need specific data from DOH in order to carry out community health assessment work and meet the standards. One respondent contended that the DOH attitude is "It's our data; we decide," which is not only seen as subverting the work of the LHJs but also as flying in the face of the Partnership's collaborative decision-making processes.

A few of those interviewed suggested that the relationship issues between DOH and PHSKC feeds the uncertainty around the future of Vista vs. EpiQMS. These individuals suggested that DOH would like greater control over a data system that it funds and supports. EpiQMS, a data system designed by DOH, is controlled by DOH. Alternatively, one respondent suggested that DOH would like Vista to meet more DOH needs as opposed to being primarily focused on meeting LHJ needs.

Conflicts of this sort, several respondents contended, are not being resolved. Conflict resolution processes are not in place to address conflicts either internal or external to the

Partnership. A delineation of roles clearly stating the kind and amount of support that will be contributed by each partner and expectations of partners for collaboration and accountability are not adequately set forth.

Finally, the Partnership offers few opportunities to review and celebrate accomplishments, according to one respondent. This individual also suggested that expectations of partners across the board are unreasonable in relation to available resources. The Partnership needs to ensure that mutual expectations are reasonable and to make a greater effort to recognize partners for their contributions. The respondent suggested that this should not mean lowering the bar for the Partnership's goals but rather just not setting the bar quite so high.

## Environment

Environmental factors that support collaboration include:

- A history of collaboration and cooperation
- The political and social climate

### *The external environment in which the Partnership operates is poor*

Nearly all respondents described the external environment in which the Partnership works as poor. Respondents noted the current state and local budget crises that have impacted public health generally and, in many LHJs, eroded support for community health assessment. Since community health assessment no longer enjoys dedicated funding, its value has waned in many parts of the state. Conflicts of one variety or another between state and local levels typically characterize any such relationships, so Washington is not unique in that regard. Such conflicts, however, do present challenges to the Partnership and to conducting community health assessment. Finally, the political struggles between PHSKC and DOH were described as historic and going far beyond the Partnership.

# Conclusions and Recommendations

Despite the challenges faced by the Vista Partnership described above, those interviewed agreed that a "get it done" attitude sustains the Partnership. Through the force of personality and passion for what the Partnership can and has achieved, partners have been able to come to the table, focus on the needed work at hand, and get it done. The Partnership has been characterized by a problem-solving orientation, a focus on creative solutions, a desire to push innovation, and a commitment to continually improving Vista as a product. Yet the problems described in this report drain energy from the Partnership's efforts and pose challenges to its future sustainability. The recommendations presented here seek to address the issues raised in the interviews pertaining to the future viability and sustainability of the Partnership.

### *Resolve systemic issues that affect the Partnership, including a breakdown in trust, conflicts over ownership of products, and uncertainty over DOH's future commitment*

- Brief DOH and PHSKC upper management on the specific issues impacting the Vista Partnership (those outlined in this report).
- Develop a process improvement strategy to address the problems facing the Vista Partnership, including the following steps:
    - Determine DOH's future plans regarding EpiQMS and clarify the impacts on Vista (resources, staff time, data availability, etc.)
    - Institute an Appreciative Inquiry process with DOH and/or PHSKC staff and management to identify what is working and what is not working with DOH-PHSKC relationship and to identify ways to resolve differences
    - Resolve the control issues between DOH and PHSKC relating to Vista Partnership processes and products
    - Identify the barriers that are currently impacting the Partnership, including the breakdown in trust between local health jurisdiction representatives and DOH
    - Hold retreats or facilitated gatherings with Partnership members to develop strategies to improve Vista's decision-making structure
    - Determine methods to endow DOH representatives directly involved in the Partnership with greater decision-making authority
- Address internal DOH differences regarding the purpose and future of Vista; obtain DOH management commitment to ensure employee compliance with solutions identified.
- Define a clear appeals process within DOH for resolution of conflicts that arise, including those among Vista Partnership members and those that occur within DOH.
- Institute clear written agreements that define roles and expectations for Partnership members, including the responsibilities of each member, the specific support(s) each member will contribute to the Partnership, and expectations for membership collaboration and accountability.

### *Improve Vista-related communication within DOH and between DOH and the LHJs*

- Examine the communications mechanisms currently in place and determine ways to improve them. In particular, look at the present teams and groups charged with ensuring good communication about Vista takes place. Ensure that communication mechanisms reach upper management at DOH to improve tracking of the Partnership and its progress.
- Increase the transparency around DOH decision-making processes (e.g., future of Vista vs. EpiQMS, funding, data sets).
- Ensure that DOH Partnership representatives have a clear understanding of DOH decision-making processes and priorities (e.g., funding, data sets) to facilitate effective communication with other Partnership members.
- Institute alternatives to a reliance on email as a communication tool, such as periodic newsletters, moderated discussions, or an email listserv that classifies subject areas in digest form.

# Vista User Needs

## *Ensuring Success by Meeting the Needs of Vista Users*

# Introduction

Vista is used by public health assessment practitioners throughout Washington State. Vista is the primary software tool used for assessment by Washington's 35 Local Health Jurisdictions (LHJs). Vista is also utilized for community health assessment by officials in State Health Departments, Tribal Health Clinics, Universities, and a Farm Workers Clinic.

A critical factor in developing Washington State's local health capacity for community health assessment in the mid-1990s was the availability of a locally developed tool for assessment: Vista. PHSKC developed the Vista software starting in 1991 to provide their epidemiology and program staff with a user-friendly tool to access timely assessment information on a wide range of public health issues. Vista was disseminated to LHJs across Washington in 1996, greatly facilitating the completion of the mandated PHIP assessment reports.
The mission of Vista, from its inception, has been to allow users with diverse computer skills the ability to access and analyze a broad array of public health data. The goal of this component of the Vista system evaluation is to assure how well Vista is fulfilling that mission.

**GOAL: Improve Vista user experience with Vista by identifying the needs Vista is fulfilling and gaps where Vista users' needs are not being met**.

- Document what the users like about the web-based Vista and any anticipated barriers (e.g., technical problems) in its use.
- Document how Vista is meeting the users' population based data needs and how Vista could better meet their population based data needs.
- Document user interface enhancements, changes to the current assessment topics, and additional outputs that the users would like.
- Gather feedback from the users on Vista training improvements and wider user deployment

# Methodology

Data collection for this evaluation consisted of creating three focus groups to discuss user needs and administering a biennial Vista user survey (see Appendix B and C).

Smith-McCann Computer Resources Inc. facilitated the focus groups. Members of the focus groups were people with current Vista logins, a total of 24 users participated. The meetings were held at three separate locations: in Olympia, Everett, and Moses Lake. Each group contained at least six participants. Participants represented a wide variety of experience levels, in regard to Vista, statistics, and epidemiology.

All focus group sessions were conducted in an organized and directed fashion. Vista was displayed using a projector for easy access throughout the focus group discussion. There was an attempt to encourage some "brain-storming". However, the discussion was "reigned in" when it might impact completion of the agenda within the scheduled two hour time-frame or if it strayed off topic.

The biennial Vista survey was administered by the State Vista Coordinator online and had as its population every individual with a current login for Vista. Out of a total of 120 current logins there were 77 responses yielding a 64% response rate. Some people did not respond because they are new users, one person uses Vista to demonstrate ways of sharing data, and others did not have time to respond. One person couldn't access the survey and another said that they filled it out and there was no record in the database.

Twenty-two counties responded to the survey this year (20 responded in 2001) and 6 out of 35 counties don't have logins for Vista (6 out of 34 in 2001 didn't have the desktop Vista/PH installed). In 2001, 26% of users were from Department of Health (DOH) as compared to 25% in 2003. Sixty-four percent were from LHJs as compared to sixty-two percent in 2003.

# Findings

Included in this presentation of the Vista User Group evaluation are the findings from the Smith-McCann facilitated focus groups and the biennial Vista survey. Although the results mirror each other, both are presented in their entirety to show the breadth of the evaluation. First, will be the findings from the focus groups followed by the survey findings.

## Findings from the Vista Users' Focus Group

This report is a summary of the responses that were gathered during the focus group meetings. The responses have been organized by level of criticality, demand and/or users' intensity of concern. In other words, if more participants answered the question in a similar fashion, that response will appear closer to the top. In some instances, comments, requests, and concerns had a similar level of significance. In those cases, the responses are merely listed in the order of occurrence.

Analysis has been limited to clarification and a search for themes. The primary intention is clear and accurate reporting of findings, with an avoidance of supposition and/or conjecture.

It is valuable to note that approximately half of the participating users continue to use the desktop version, even though the data is not current. The reason for this choice is that only the desktop version allows for sub-county data division. Also, there are some technical problems, which result in Vista failure.

## Web-based Vista

**What do you like about the web-based Vista?**

- Majority of users are happy with speed; "Analysis is much faster than desktop version".
- It's similar to the desktop version, which reduced the learning process. Plus, "it has fewer screens, so it's easier to use".
- "It's not reliant upon SPSS. I think SPSS crashes a lot".
- "It isn't possible to touch the data. So, there is no risk of doing damage". Also, "everyone uses the same data (no risk of different results)".
- "Grid output is faster than excel; it's good for a quick check of results".
- "When there is a revision, there is an update note". "When I accept the update, it loads, restarts, and the software is current".
- "Great support from Julie. If I don't work with it often, I get frustrated".

**What are the barriers (e.g., technical problems) to the web-based Vista?**

- Some LHJs have system "write" protection, which prevents a typical user from installing the application. "Technical people may take months to update an application because it is considered a low priority". At least one small LHJ is still able to use only the desktop version.
- Some older Vista releases require a un-install and re-install. When the user accepted an upgrade, Vista was damaged and no longer runs.
- "Vista crashes sometimes, and it is often hard to determine the cause. There are some assessment topics on the screen, which aren't really available, selecting one of those causes Vista to crash".
- One minor problem that occurs often – the user exits Vista "only to discover that it is still up and running. Its not critical, merely annoying".
- There are time-out issues, which seem to result from overly complex analysis requests. However, it might also be due to slow servers.

**In what ways is Vista meeting your population based data needs?**

- "I have analyzed teen births. I hope to eventually do a report card".
- "I want to use it in a proactive way, to encourage preventative measures. It has been helpful in looking at the value of prenatal care. With no prenatal care, costs go up. I have used trends and numbers to show that TB is increasing. This type of information gets the attention that gets results".
- "I collect and disseminate data in the form of fact sheets. Grant writers come for information, as do community leaders and stakeholders".

- "I use it to prepare tables for users on a variety of subjects. Since our County is large and diverse, I use most modules and most features on a regular basis. I also am frequently called upon to do sub-county level analyses. We also use Vista to prepare reports. The most extensive is "The Health of King County" which is due to be updated this year".

**In what ways could Vista better meet your population based data needs?**

- Primary barriers are problems related to DATA, or the lack of data. "We need sub-county data". This is an ongoing problem. "Any work with planning requires sub-county data". There are a variety of desired boundaries preferred for sub-county data:
    - Many say block would be great.
    - "Zip-code would also be good. There is concern over the value of zip-code boundaries, but people often request analysis by zip-code. Zip codes change which causes problems when comparing multiple years".
    - Some users want Census-tract divisions.
    - Another popular choice is school district "We get a lot of call for that and it is stable over time".
    - "They are all needed for assessment, depends what you are working on".
    - "Our small LHJ has special needs related to sub-county data. Some of our [county] kids attend school in a district outside of the county. People always want to compare these two parts of the county. These parts of the county are very different in other ways, too".
    - "If they give us the smallest unit then we can construct the larger grouping, as we need to. However, that brings up the confidentiality issue". For public release zip is as far as I go. If you provide latitude and longitude, you might as well give identification".

- There were other comments in regard to lack of current sub-county data.
    - "Population estimates need a lot of work, 1990-2000 needs a lot of work, especially race".
    - "Population by age and sex are way off in our county. The data is a year behind, plus, 500 males (a prison population) were counted in the wrong county".
    - "Its makes so much sense for the state to do sub-county".
    - "We should have a Health Informatics CDC Fellow do the sub-county data".

- Other population based data sites users would like included in Vista
    - High demand for Cancer Register Data. "This week a nurse wants me to look for cancer cluster in a portion of the county. I can't do it with the data that is available in Vista".
    - "Vista should include costs and payments information. How much money was spent for health from Medicare, Medicaid, Basic Health? It would also be good to have it by race, ethnicity and age. If this information was on Vista we could demonstrate its importance. Vista

would expose under-reporting, and close the information gaps. The community partners would be shocked to see elderly fall data. Cost information in Vista could be used to create a lot of visibility for Vista".

- More than one user felt it would be quite helpful to have National data to use for comparison. "Public use data sets are available. We should be able to compare to national numbers. National Center for Injury, National Center for Health Stats, Cancer Registry, should all be linked or at least be documented in the help notes".
- A few users said they need more data from CHARS – "information from birth records: place of birth, unintentional injury, etc".
- There is frustration related to data not all located in one place, e.g. DSHS, BRFS, etc. However, it was also noted that there is a problem mixing survey sample data with population data.
- "I would like years of potential life lost per diagnoses" (e.g., leading causes of death and associated years of life lost). Note: Instructions for calculating the desired information would satisfy this request.
- "Vista doesn't do prevalence. Some state sources are much more up to date. Communicable disease is more up to date".
- At least one user would like to import data from Target in DASA citing it as "incredible data". "I love the drug abuse topic in Vista, but it needs to be broken down more".
- "Vancouver, B.C. is very helpful for Seattle. It would be a great to have a link to WHO data. Comparing Seattle mortality to Vancouver could be valuable".
- Census 2000 is not available on Vista. "That is a big problem".
- "Crime information would be great on Vista".
- "Need Environmental Health data in Vista. We should be doing trend tests related to wells that are out of compliance, crime and justice, and methamphetamine-lab tracking".

## Interface

**What enhancements would you suggest for the interface?**

- Error handling: Pop-up window(s) to display an error message when a user error occurs. Example: it's necessary to select the Assessment topic, then a Geographical area, prior to specifics within the assessment area. If the user attempts to select assessment particulars first, there is just a blinking cursor. There should be an error message explaining the requirement.
- "[There should be] instructions on the steps you [must] take before you can launch – it's very frustrating". Many novice users agreed.
- Many users stated that the functions they execute frequently are easy to perform. However, those only used occasionally are forgotten and give them problems. One participant complained of being unable to remember how to use Vista because of doing so infrequently.
- Many users mentioned problems understanding the screens (e.g., what does something mean, how is it used, etc.)

**Help and data notes:**

- Many users would like more information explaining data (e.g., what is the data source, how is the data broken down, who is responsible for the data break down, etc.). They need more information describing the data. Also, "The notes are often out of date and not really adequate [to meet the need]".
- There is quite a bit of confusion concerning data breakdown in regard to race, particularly ethnicity/Hispanic. Also, many weren't sure if there is a way to select non-Hispanic. "In Central Washington it is important to have both Hispanic and non-Hispanic". It was also felt that there would be increasing confusion in regard to race, ethnicity, and multiple races. The final conclusion was that there is a need to maintain consistency with the latest census changes.
- Need broader or more in-depth information in the help sections. Although help provides information specific to a single topic, it provides little general help.
- "In-depth Help could exist on a separate, optional site".
- "The help section should explain confidence interval and chi squared", which are confusing for many users. Also, it would be good to print the explanations on the output.
- Without training most users have trouble with the 'conditional' option on the Birth Risk Factors screen (even with training, a number of users find it hard to remember how this works). Consensus that 'conditional' is hard.
- Death rates are particularly confusing to many. There needs to be more information on the topic in both the help and data notes.
- There is some confusion regarding the use of both the question mark and 'help'. If one or the other were used consistently, it would be clearer.
- 'Point and click functions' were desired.

**Online training and manuals:**

- "An interactive manual, available through the web site, would be great. It should describe what Vista can do and what Vista can't do. A help site would be nice, too".
- Participants felt that a tutorial in print on the web would be better than the sort of tutorial or 'wizard' that would walk a user through the software, because it should cost less.
- "It should be possible to alt + right-click on every topic". There are still some for which this won't work. Anything that makes interpretation clearer is important".
- "It's frustrating to click help and find nothing there. It's also irritating to see 'the data notes have been up-dated' when the notes are out of date".
- The difference between neonatal death and infant mortality is confusing to a number of people. An explanation should be added to the data notes.
- "When running an analysis of leading causes of death for 1990-2000, or birth risk factors - with conditional - for 1990-2000, it is very slow".
- One user said, "Sometimes I don't see "calculating results"; I log off and start again".

- Since the NCHS codes are not used in most publications, it is hard for many people to link a disease name to the code. Sometimes the same code is seen with a different name associated. A definition of terms would be helpful. Another suggestion was user-friendly definitions for cause of death and hospitalizations (e.g., "stroke is the same as CVA"). Simple clarification notes would be helpful.
- Another problem occurs when comparing hospitalizations and deaths, because hospitals don't use ICD codes at admission.

**Other:**

- Users were unhappy with 'grouping'. There is currently a preset group of ICD codes. Users would like to select their own groups. For example, users would like to use Psychosis and choose any dementia or drug-induced psychosis.
- There is not enough information about classifications and what they mean e.g., "what do modified and original mean?". These need to be broken down further.
- A few people wanted to know which other counties were similar in size and population. The information would be used to gather comparison statistics. It was noted that The Office of Community and Rural Health has the state divided into five categories based on geography, demographics.
- "If we get sub-county data, I want a touch screen map to identify geographic areas."

## Assessment Topics

**What changes to the current assessment topics would you like to see?**

- Describing Birth Rate as Fertility Rate was sited as "very confusing" by a number of people.
- "Low birth weights should say that both moderate and very low are included. It's confusing data".
- "Each of the buttons should have a help note – more than just definitions, an explanation of when to use them".
- "All the data help screens need to be reviewed by someone who is not an epidemiologist. They are too confusing for less knowledgeable users".
- "There should be a help phone number on the screen".
- "There should be a note that explains when to use Crude rate versus age specific. Another possibility is a hyperlink that sends you to the DOH sites explanation".
- "Notifiable conditions need to be current. They changed two years ago. But Vista wasn't changed. Also, not all notifiable conditions are there. Birth defects and lead poisoning are missing".
- "Vista only uses overlapping confidence intervals. This seems to be a Washington thing. T-test and Chi Square would give better results".
- "It would be easier to manage death analysis if it were possible to select from either or both ICD 9 and ICD 10 codes (in the same run)".

- Participants want the ability to go back into a Quick Group and edit it. Quick Group needs to include the ability to edit the label. Also, it should be possible to edit a saved group. "The death rates are misleading; the NCHS leading causes only have 50 selections. Officially there are 110 and it should then say 'all remaining'. Vista doesn't tell you that".
- Users desire a way to choose the top 5 (or 10) causes of death. Many users do mortality analysis using the top causes. "It should be easier to do the ranking; it is currently somewhat complex and very time consuming". They would also like leading cause of death by diagnosis and age.
- "We need current numbers, current hospitalizations."
- "We need a standard set of health indicators, our health communities would love to see a consensus on what indicators are important so they can compare three year rolling averages all on one page. We could produce a health report card; push a button and get sub-county health indicator data. It is complex, but do-able and would be great. It should contain things like leading causes of death, population, infant mortality, etc. People could see the changes over time. In California and Minnesota, you could plug in the county and get those indicators and trends".
- A number of the participants would like a link to BRFS.
- Users want more HIV related data; specifically people living with HIV.
- One county expressed the need to perform analysis on the 0 to 3 age group. "This is especially important relevant to inoculations".
- They want National data for comparison.
- "It would be helpful to have a link to DSHS".
- "I want payment sources".
- "I need more birth data: was MCH education done and other fields on birth record".

There was some concern that excessive enhancement to Vista would eliminate its simplicity of use. "The more bells and whistles you add the more confusing it may become for new users. We must have a balance".

- Suggestion: "There could be a separate, more advanced screen, for more complex runs".

## Outputs

**Are there additional outputs that would help meet your needs?**

- "Comments in the output should describe the streams."
- "Data sources should be documented in the output."
- There is a need for ICD codes on the output. These should at least be in the header or footer.
- "Hospitalization doesn't mean ER visit etc. The output should say, 'Excludes ER visits'".
- Output should say, "Excludes unknown. Missing data has burned many users".
- "If excel is already open, Vista should open a new workbook, not a new session. This would allow cut and paste and easier modification".
- They would like ICD codes on output and to detail what was grouped.

- Outputs are confusing unless many explanations are added.
- "The desktop version of output was better in a number of ways. It had both count and average population. Vista doesn't include average; the output can be very confusing. The desktop version provided a better description of the output, at the bottom of the excel work sheet. It also had data sources listed on the output, and a data definition along the bottom. These features should be added to Vista".
- "It is possible to link streams, using macros, to a preset output. However, it's somewhat complicated. It would help to have simplified routines or methods for standard charts, graphs, tables and other canned graphical outputs. I want a standard chart and table option, bar and/or pie graphs. Something like whatever is in the Health of Washington.
- "Include links to excel for confidence interval and charts".
- "Print confidence intervals and chi squared explanations on the output".

**Describe examples of additional output that would help meet your needs**.

- "I would love maps if we had sub-county data. Arcview is the standard mapping tool. It should be used if mapping is added to Vista".

## Training

**How can we improve training for Vista?**

Most users were as much or more interested in information "at their finger tips" than actual training courses. The reasons mentioned were lack of funds and time for travel and the need to know sooner than training was available. They are interested in both training and reference material.

- Need a training manual and a user/reference manual, "the old one is out of date". "We would love a user manual on the web site! Maybe even a PDF version". "Any manuals must be linked to a screen, or PDF, not paper". They want it to be easily accessible.
- Many participants requested learning materials developed at Spokane Regional Health District be shared and distributed at Regional Assessment Meetings.
- "We need an online tutorial. It would be helpful to have the training exercises available on the web. Users could insert their own data if they knew how to do it".
- "There was a Vista power point presentation on WA-Assess at one time. If it could be located, it would be nice to have it in a manual".
- "Story problems are really useful. Create scenarios in the training. Then make them into modules to put on the web. SPSS has scenarios and they make it much easier to learn and understand". Also, "Julie could post interesting scenarios. Users who have done something interesting or complex could submit a step-by-step module".
- "Video training could be used if necessary; however, we need our computers during training. How about CD"?

- Confidence Intervals are a topic which many users found confusing. There was also some discussion regarding the significance of confidence intervals wondering if there were a better way to look at the data?
- "Need info about Chi Square and formulas. For instance, a bit of background, what it means, etc. There are good definitions in the Annual summary. These should be tied to the interface".
- **"**I want more information about using 'conditional' with birth risk factors".
- "There are so many new assessment coordinators and assessment is never covered adequately".
- One county uses "cheat sheets", which document the steps for common though hard to remember functions.
- "Data usage is currently covered in the exercises and training. However, it would be really helpful to have more detailed information on the data and its intricacies, plus its uses and limitations (e.g., smoking relevant to pregnancy is self reported, and probably under reported)".

**Class training:**

There is a desire for more in-class training. There was no consensus about where or when.

- "Training needs to be other that at Joint Conference. It also needs to be directed at both epidemiologists and non-epi people". "Need training on assessment, and advanced epidemiology. Need to know how to translate a lay question into epidemiology and then how to use Vista to find the epidemiological answer".
- "We need more frequent training. General conference is not a good venue for training. We need a whole day beginner course, and half-day refresher courses. Not enough money to get it local, where it's needed".
- "I would like training to be a day or two in each county; a hands-on class where we can actually create our own product, like our health status report card".

**Other training issues:**

- A number of users want to create maps showing analysis results. However, quite a few of them seemed to believe maps are too complicated to create, even with training. "GIS is a whole separate area. We would need special classes to work with GIS and produce maps".
- "Julie is always helpful, but she is only one person".
- All of the following training topics were mentioned as being needed:
    - Data usage and limitations of datasets
    - Vista software, assessment topics
    - Excel, GIS
    - Statistics, epidemiology

## Additional Users

**What potential opportunities and drawbacks do you see to disseminating Vista to other users? Who? What would they use Vista for?**

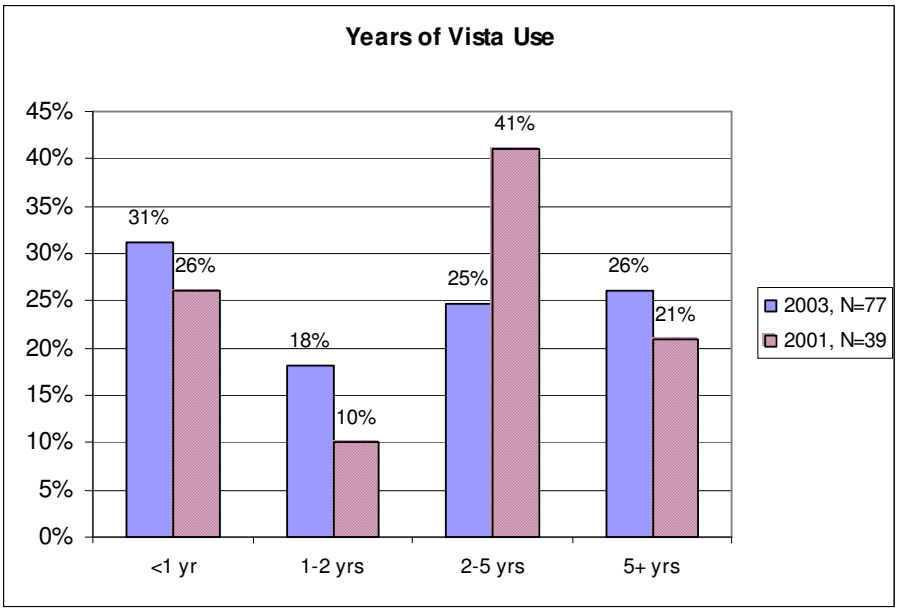
The majority believed that many difficulties and problems would ensue if additional groups were allowed to access Vista. Most believe that Vista usage, the intricacies of the data, and the interpretation of results are all too complex for non-health personnel (e.g., the public). The primary concerns are that most additional users would require too much training and support. Plus, lack of knowledge in regard to epidemiology and statistics would often result in misinterpretation. There was support for wider use within LHJs, "it would relieve the workload within an LHJ if others could access Vista not just assessment staff"

- "DOH could offer canned, automatically updated data like CDC or BRFS. If the reader has further questions, they should call the local LHJ".
- "If members of the community have access to Vista, confidentiality could be compromised, especially if sub-county data is available. We need to consider the data suppliers, not just the users. There could also be legal ramifications".
- "There should be a set protocol regarding who can use Vista, how they get training, security, etc. It would be nice to have a policy on the website and a lawyer on the Vista Advisory to act as consultant".
- "Adding user groups might require the addition of expensive security control software".
- "The problem is that there is no capacity to do community health assessment. We need other skilled people to share the load. The flip side is if you give authorization for others you would end up spending more time explaining and interpreting the data".
- "It has never been tracked who has the desktop version of Vista. Some people are using really old population estimates".

# Findings from the biennial Vista Survey

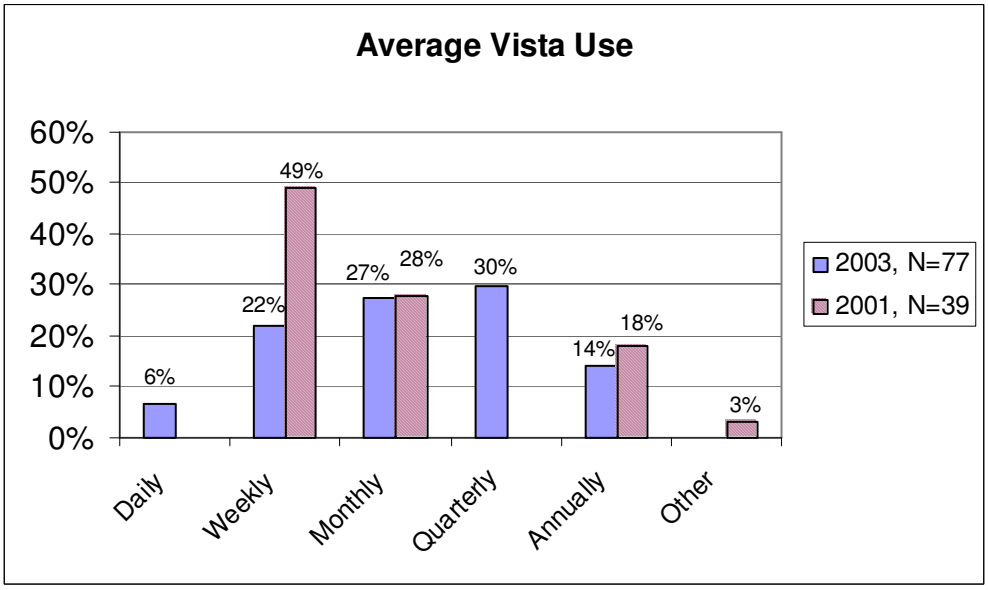
### How long have you been using Vista?

In 2003 there were more users in all groupings except the 2-5 year range. There were many people with over five years and 2-5 years of experience but we also have more new users with less than 2 years of experience.




**How often (on average) do you use Vista?**

Most people reported using Vista weekly, monthly and quarterly in 2003.




**Is Vista your primary tool for accessing and analyzing quantitative population-based public health data?**

| | Yes | No |
|---|---|---|
| **2003** | 44 (57%) | 33 (43%) |
| **2001** | 22 (54%) | 19 (46%) |

**What other tools do you use to access and analyze quantitative population-based public health data?**

| SPSS | STATA | EpiInfo | SAS | Other |
|---|---|---|---|---|
| 29 | 22 | 18 | 12 | 11 - Access, Excel, DOH, CDC Wonder, Native Health Clinic Statistics, Other agency web sites and reports |

**In general, what do you use Vista for (please check all that apply)?**

| Use | | Yes |
|---|---|---|
| Requests for information from outside your agency/organization | | 55 |
| Requests for information from within your agency/organization | | 52 |
| Public Health Assessment Reports | | 37 |
| Developing Public Health Fact Sheets | | 31 |
| Grant Applications | | 27 |
| Surveillance | | 22 |
| Bioterrorism Preparedness and Planning | | 8 |
| Other (20) | | • Verifying tables that I have produced with SAS<br>• Providing technical assistance to local health assessment staff<br>• Evaluating info contained in Certificate of Need applications<br>• Currently the best source for 1990 US Census data<br>• Annual Work plan for Budget process<br>• Topical reports like child health or women health<br>• To prepare "county profile" fact sheets about children with special needs<br>• Annual reports |

**Describe the last time you used Vista:**

- Yesterday I updated slides for a maternal & child health presentation. I used infant death, birth risk factors, and fertility rates.
- Request from a community member regarding teen pregnancy rates in a certain area.
- I was trying to get a feel for how rates for different diseases vary between the different counties in bioterrorism preparedness and planning region #8.
- I used Vista to find out infant death rates by county.
- STD rates over the last 5 years for internal purposes
- I was looking at hospitalizations for mental health and substance related issues. I have been working with the Community Services division of Spokane County on a county needs assessment for DASA.

- Assisted a local health assessment coordinator in generating teen pregnancy rates for her county. Walked her through the process of running the data and making a chart in Excel.
- Death rates sometime in the last 6 months. Specialists were out of the office, so I used Vista to answer.
- County Pregnancy Rates
- Preparing a presentation on aging for the board of health, non-childbirth hospitalization rate by age groups in King County, today
- Validating maternal smoking by age and race for tobacco team
- I was updating grant application information for counties. There were several health related variables that needed to be looked at.
- Ran State and County birth outcome data (prematurity, LBW, etc) for comparison to March of Dimes data. I still don't know where they got their data.
- The first, last and actually only time I have used Vista was to update MCH fact sheets with the 2001 data. I'm new to this position; my co-workers use Vista often and I'm sure my usage will increase over time.
- Used to determine leading causes of death in a county
- This week examined pregnancy rates to develop a fact sheet.
- HIV data for outside request
- Data request from local church- wanted to know teen pregnancy rates for Seattle in order to plan service programs
- Influenza rates for ICD9 codes 480-487
- Working on maternal/child health module for Island County, used as one data source
- Today, looking up mortality data for Washington State counties.
- Clark County Chlamydia morbidity and case rates for the last 5 years.
- Falls as cause of injury death and hospitalizations for those over 65 years of age, February, rates provided for county and state
- Sub-county analysis of fertility rates (today)
- In February 2003, I got age- & gender-specific pediatric population figures for the state, for calculating hospitalization rates for selected vaccine-preventable illnesses.
- Maternal Smoking, Under 20; Deaths, by Race/Ethnicity
- Yesterday, I was calculating the counts and rates of suicides and suicide attempts by those under the age of 24 by gender, age group and method.
- It was in Aug 2001. I had a request from WSU for the number of births by zip code in Whitman County for 1995-1999. I did the request and emailed her the results
- Unintentional Injury data for reports this morning.
- Ran data on intentional injuries, using the new injury groupings.
- I was looking at asthma and comparing Whitman to other counties
- This week - doing an updated fact sheet in our Community Health Profile series. Used it to look up suicide mortality information for Kittitas County.
- We grouped the counties in Region 3 Public Health Response and looked at communicable disease data.
- Hospitalizations for asthma by year and age group for children in Snohomish County and WA

- Reviewed a published data indicator on the national level of teenage pregnancy rates in Washington State.
- Updated health status of Clallam County - looking at mortality, morbidity and natality indicators.
- Assisted students in conducting the epidemiological assessment utilizing the PRECEDE/PROCEED Model as part of a classroom experience. This was November 2002, as part of the HED 471 Planning I course here at Central Washington University.
- Age-specific mortality rates; about 6 months ago
- Responded to a request from a community group interested in knowing the youth suicide death rate for the county and whether it had changed over time.
- TB Epi profile for the state - used race/ethnicity breakdown for population stats
- Defining upper & lower bounds of mortality rates of fatal injuries in WA & specific counties two days ago.
- Death rates for heart disease and cancer for South Hill, a CDP in Pierce County (used the desktop version for sub-county data)
- We were working with CHOICE and local partners for an application for a FQHC.
- Diabetes Statistics in Spokane, WA
- Singleton low birth weight rates
- Calculated rates of children with low birth weight by county for the past three years.
- Last week. Botulism in Benton-Franklin Co.
- 5/15/03 - request for mortality rates and life expectancy for white versus African-American in Kitsap County - this was for a minority health presentation to be given by our health officer.

**What do you like about the web version of Vista?**

Many people commented on ease of use, ease of updating, the data and statistics available, the fast speed and not having to work with SPSS as things they liked about Vista.

- Having all the data centrally located; when it's updated, it is easily accessible.
- You don't have to load SPSS on your local PC.
- It gets updated automatically
- My favorite aspect is that you can make most of your selections on one page. It's also fast and flexible.
- Easier access to updating data i.e. quicker availability of 2001 data and consistency
- I don't have to do the up-keep on the data sets, or fix unexpected SPSS errors.
- Pretty clear instructions; I especially like the use of color to let you know what's going on.
- Ease of installing new features.
- Updates are done on your end. Easy to update
- It is much easier to use than the SPSS version, and much faster. Used to get stuck with the non-web version because of various problems with SPSS, now that does not happen.
- I like the fact that I don't have to have a disk installed.

- Easy to use, versatile, thorough.
- Easy to get to. Easy Access. Speed of access to information.
- It's there and ready whenever I need it. The information is at my finger tips.
- Faster
- UPDATABILITY! Can fix bugs and update data quickly. Also can install easily at home.
- It is quick, has lots of data sets, very convenient, has confidence intervals
- It is easy to use and is fast. I have had no problems with the system locking up like the desktop used to. I know that I have the most current info available when I open it I don't have to worry about CD updates.
- Timely updates and knowing it is consistent across LHJs
- It looks and works exactly like the desktop.
- Easy to update. Plus the new version of Vista has the nationally approved injury classifications. This GREATLY benefits my program (in terms of increasing ability to analyze and interpret injury trends in a timely manner)!

**What barriers (e.g. technical problems) have you experienced with Vista?**

Many people said they had not experienced any technical difficulties. A few people said they weren't having technical problems but the lack of sub-county level data was a significant limitation. A couple of people said they sometimes get "kicked off" as they are processing a request, have to log back in and redo the request, but generally don't have any more problems.

- One day the server wasn't available...
- Problem with a personal computer.
- Some data are not available in the web version.
- Loss of internet connectivity.
- None. Forgetting my password.
- I have to have IT folks download the interface but that is an internal issue.
- Occasionally it will freeze up when pulling into the Excel spreadsheet
- I have recently encountered problems with the Quick Group function in both Death and Communicable Disease modules. Under certain conditions, the Quick Group counts do not equal the sum of the individual selections.
- Not having access to the infant death module for more than a year. Can't enter own ICD codes. I pushed custom data on the pop tables to see what that was and it entered a loop that it would not let me out of (i.e. cancel did not work)
- Sometimes when I have another excel program open, it dumps the data output into that file.
- Needs to incorporate census data. Population estimates by race and ethnicity are not necessarily accurate.
- I am a MAC user, and I have to find a PC computer lab on campus willing to let me download the software, and keep it there.

**Improvements to the Assessment Topics:**

- UPDATED HOSPITALIZATION INFORMATION!!!!!
- Sub-county analysis
- An ability to incorporate local population based data sets.
- Think they are fairly good--perhaps could figure out a way to include injury and communicable disease data on a monthly/quarterly basis?
- HIV/AIDS data?
- Availability of cancer registry data
- Gender data in more categories
- Updated injury groupings for hospitalization data
- More current year of data available and ability to break out by all demographic fields - same topics/fields available as on CD.
- Mapping
- I'm happy with what we have, current system suitable for my needs
- ICD based analyses

**In what ways does the current output in excel meet your needs?**

- It's easy to manipulate and understand
- The out-put is clear and informative.
- The output is in a very familiar format to most people who request data from me.
- It gives all the information needed all in one place all at the same time!!! And I can arrange it to present in the sort I want it to.
- It's flexible - allows me to create a chart/table that works best for a particular situation.
- Gives me rates, counts, and confidence intervals. I like the chi-square test for trend (but wish Vista still gave me the chi-square and significance of the entire Chi-square and the non-linear components).
- Provides data in easy to interpret, logical format
- When I do a trend I can see what is going on in my community in certain areas.
- Documents data runs and statistics well. Very useful how ordering of output can be easily adjusted as needed.
- Fast, clear and well explained.
- Provides the needed figures, it is flexible and makes it easy to cut and paste into other documents or tables for various calculations.
- It can easily be emailed to a requestor.
- All requested information is in the output
- Can easily make charts and graphs
- Excel is a standard package that lends itself to charting and graphing.
- Really great for cutting and pasting to create charts. Also like the fact that I can now get multiple pages going in a workbook instead of a new file for each data run.

**Are there ways the current output can be improved?**

- For users without Excel skills, having an automated output option (i.e., output directly to a chart, table or map) would be very useful.
- Something to help with making charts, such as macros in Excel
- Would love to be able to output to standard tables--and group over the years and just add in the last year of data.
- For mortality, I would like to see the output include the ICD codes. Any published tables should include these and it is tedious to add them to Vista output.
- I would like to see some standard graphs, charts or maps produced on certain topics.
- I usually am making customized tables from it so I don't want it to be too formatted.
- It could be labeled by gender and age group instead of taking up a whole column to specify gender and age.
- I think most people create a custom header to modify outputs for lay consumption. Perhaps it would be helpful to include a second sheet as an option with more user friendly headings and text explaining confidence intervals etc.
- Ability to place more than one table on excel sheet without having to do so manually. (I can look at variations of a category on the same sheet - rather than several sheets of info.)
- Output option as a simple flat file spreadsheet so that it can be directly imported into analysis programs without much manipulation
- Perhaps in the HELP menu, more detail on formulas used for calculating YYPL, analysis of trends, etc. Perhaps it's there and I just haven't found it.

**Additional output that would help meet your needs**

- Maybe some maps/graphs.
- We just need one column added to the Excel file with the list of ICD codes.
- I would like maps, charts and graphs that are a standard option in each assessment topic. This way I can either select from a standard output option or make up my own output.
- http://www.cdc.gov/epo/dphsi/asb/orcmacro.htm
- Unaware of other examples

**Vista Training Participated in**

Vista Training Workshop (46)
Over the phone TA (22)
Online exercises (15)
Site Visit (13)
None (9)
Other (8) Internal staff trained, other staff who know, figured it out on own, call Jim Allen, received all of the training above, doing the training above.

**If you have <u>not</u> participated in any Vista training, why?**

- Vista is so easy to use that I haven't needed the training.
- Time constraints & lack of familiarity with whether Vista will be useful to me or not.
- The online exercises were clear and concise and taught me enough about how to learn Vista for my purposes.
- I feel like Vista is pretty self explanatory. When I have problems, I have a more experienced user that I can ask for help.
- I've worked as a Vista trainer and provided site-based and telephone support - but I've never been a training participant.
- I am planning to attend the Vista Workshop in May.

**Have you attended more than one Vista training workshop**?

Yes (19) = 25% of respondents

**What is your priority for training in 2003-2005?**

- Would love to attend a training that covers all the basic data sources and lets us download our data specifically by topic so we have a short report when we go home....
- Vista Stata
- Usage of cancer registry data when available
- To have some of the STD field staff trained in Vista.
- Sub-county denominator data and more flexibility with cross-tab groupings
- Setting up county-specific data (sub-county aggregations).
- Need basic training with advanced training over time
- Managing Vista to excel output
  Excel training
  Knowing what questions can be best answered by certain Vista assessment topics
  Making actual fact sheets
- I would still really like to understand the streaming capabilities and figure out how to incorporate it into our data requests. I know there is something there, but I can't seem to get a handle on it.
- I would like to see us cover the fundamental epi concepts and provide overviews of the data sets in Vista.
- I want to be able to customize my output.
- Get other staff trained.
- Become more familiarized and proficient so I can train people in my unit
- An update on the Vista web version.
- Combined Epi and Vista training plus training in sub-county analysis and Vista

**What is your preference for ongoing support?**

Vista Training Workshops (38)
Over the phone TA (27)
Online exercises (26)
Site Visits (10)
Other (6)

- The advanced option was good at WSPHA.
- Sample homework assignments to work on independently to give more practice in using Vista and also increase skills in interpretation of reports.
- In my case, staff training worked great - others may not have that option.
- All have their place. It's really nice to have options. At this point, I could probably use a short (2 hour) workshop that reviewed basics and some practice.

**Would you be interested in a web-based training module**?

Yes (59) 77%

**Is the Joint Conference a good site for you to attend Vista Training?**

Yes (38) 49%

**Additional comments on Vista Training:**

- This year we are only sending one person to the conference though so I don't anticipate receiving any advanced training during 2003.
- Joint Conference is fine if you are on the list of attendees. However, with limited funding that will diminish travel funds and possibly reduce attendance.
- It works very well to add an additional day onto the Joint Conference
- It is difficult for staff to find enough time to work through a web-based module since my staff has many other assignments. We do not have the resources to send very many staff to the Joint Conference so that will not reach everyone.
- If the training is on a day (suggest day before) that still allows attendance at the main conference
- I have found the hands-on training with a manual helpful as well as individual assistance walking through a certain request.
- If you do training at the Joint Conference, please do it so we could drive up and back in one day... I'd go to the conference just for the training and not stay overnight.
- As long as Vista continues to function in the same way that it has in the past, I would not need any extra training.
- Connect with BT

**Identify and describe one aspect of support for Vista you would most like to see improved:**

- Standard table output
- Small area estimates of population in between census
- Screen size
- More information available regarding the use of Vista to access other datasets. New Assessment people should be proactively contacted for Vista familiarization.
- Hook up with other databases (Deaths, CHARS) and work in more detail with them.
- Give me a chi-square test, so that I can test county vs. rest of state.
- Development of new sub-county population estimates.
- Add a MAC platform.
- 1) Add census data tables 2) Add "report card" feature
- The procedures for translation of hospital zip code into county code needs to be standardized for the agency, and reflected in the hospital discharge data produced through Vista
- Implementation of the work plan items developed over the years

**What is your vision for Vista in the future?**

- Web-based. Automation in generating/updating raw data for Vista from death, birth records etc.
- Visioning discussions for Vista have gone on for many years with lists of ideas and priorities made - I don't think I have any ideas beyond those. Mapping, current data, user-friendly interface, additional population-based data, etc.
- To have Vista continue to grow in order to meet the evolving needs of assessment staff in Washington State.
- To have the morbidity inserted into Vista soon after the end of the year.
- That it would have lots of state data accessible on the web. The contact people for each health topic area would be listed on the web in a notes section. That the outputs would eventually include some charts, graphs and maps.
- I would like Vista to continue to integrate new measures of community health. Beginning to see the inclusion of injury data is a very positive step!
- I would like to see Vista available on a web site that the public can access.
- Use Vista to help produce data in Tobacco Prevention through interactive use of several databases.
- Hmmm... I wonder if it could ever branch out into survey data?
- Continued development of the Vista platform to include more rapid updates of data, new sources of data (BRFSS, national data, Healthy People goals) include GID outputs. Seamlessly include sub county data provided by counties.
- Continue development that answers LHJ needs for vital records information and analysis
- All the current modules up and working.
  BRFSS data.
  Medicaid Data.

- All my staff would be familiar with it and some staff would utilize it frequently.
- Increased access for public health employees across disciplines
- I would like to see more people have access to Vista and see the database grow in the number of topics as well as years of data available.
- More flexibility - like the ability to remove military population from some assessment topics such as birth risk factors, crosstabing specific fields in the death cert with leading causes of death (such as location of death).
- Enhancement and maintenance.
- Tie in with CA registry, Chronic disease data. More environmentally related categories.

**Other Comments:**

Many people expressed thanks for all the work of the Vista Coordination Staff!

- Sub-county population estimates are critical to local community health assessment efforts. This should be a definite high priority area for development.
- My dream is an integration of socio-economic data with all health data (death, hospitalization, illness, medication usage).
- My use of Vista is minimal; however, I'm glad it is there when I need it. Many of our analysis needs are met by the IDRH Assessment Office so my use/need is usually sporadic.
- Essential for the public health assessment system in Washington State.

# Conclusions and Recommendations

These conclusions and recommendations were drawn from information gathered through the three focus groups and the Vista User Survey.

User needs are fundamental to guiding the ongoing enhancements to Vista. **Vista is fulfilling many user needs.** LHJs rely on Vista as their primary assessment tool for reporting data. Users like Vista because it is fast, easy to use, well supported, familiar, reliable, and produces consistent results throughout the state.

- **FAST** -- The majority of users are very happy with the speed; analysis is much faster than desktop version and faster and more reliable than commonly used, commercial statistical analysis software. The "grid" output can be used for fast analysis.
- **EASY TO USE** -- The software revision process is automated; updates can be applied at software startup. It is fast and easy to maintain current software release. Since VistaPHw has fewer screens than the desktop version, it is easier to use.

- **WELL SUPPORTED** -- The Vista coordinator provides excellent, responsive user support and resources.
- **FAMILIAR** -- VistaPHw is similar to the desktop version, which has reduced the learning process.
- **RELIABLE AND CONSISTENT** -- The data is "read only" and stored on a DOH server. As a result, 1) it is not possible to erase or damage data, 2) since everyone in the state is accessing the same data and the same software, results are consistent throughout Washington state (no matter where they are produced), and 3) everyone using Vista is always assured of having the most current data.

The recommendations presented here seek to address the issues raised in the evaluation where Vista Users' needs are not being met.

### *Improve the Vista front end; Increase user-friendliness of screens*

- Consistent use of help button or question mark, not both
- Prominent help phone number to call for additional assistance
- Hover message for easy help and click for a more detailed explanation
- Coaching or prompts to explain steps needed to do analysis
- Update help notes
- 'Conditional' needs to be changed or clarified as to its meaning and use
- Clearer help about closing down, remove x for closing as must use exit program
- When software is updated explain what was updated and why

### *Improve the data; Increase Community Health Assessment Capacity by making the data current and complete.*

- Create sub-county population estimates and numerator data
- Build in functionality to analyze sub-county data
- Custom data sets need to be available much like case file in desktop version. This will include indicators not currently on the web version.
- Update reportable conditions to comply with criteria adopted by DOH two years ago
- Add 2000 US Census Data, to allow comparison with 1990
- Add more variables from current data sets, e.g. cost information, CHARS data
- Ability to select any ICD code (ungroup)
- People have additional data needs, but adding new data is not feasible at this time.

### *Improve the output of the analyses*

- List consistent data sources on output
- Have ICD codes displayed on output
- Links or explanation about all output fields, e.g. Confidence Intervals, Upper Bounds
- Output average counts and rates
- More automated options for output, e.g. template for report card, maps, tables, graphs

### *Improve Training*

- Consult with DOH Health Education Office or other learning specialists to make training more effective
- Partnering with Bioterrorism (BT) to conduct basic epidemiology training
- Schedule regional trainings that enable participants to produce their own status reports

# The Vista Software

### *Enhancing Washington State's Community Health Assessment Tool*

# Introduction

Public Health Seattle & King County (PHSKC) began developing the Vista application in 1991 to provide their staff with a tool to access assessment information on a wide range of public health issues. Vista was developed to enable public health staff with the most basic computer skills to perform a quick and easy analysis of population-based health data. At the time of this report, there are 131 people authorized to use Vista.

The current Vista application (VistaPHw) is comprised of: 1) the user interface application that allows the user to build an analysis request; 2) the calculator module that runs the analysis and returns the formatted results; 3) the update module that downloads new versions of the user interface and associated text files; 4) the Vista databases, which contain the aggregated numerator and denominator data used for the analysis; and 5) local text files that hold menu data for the user interface.

# Goal and Objectives

## *GOAL: Increase potential of Vista's smooth migration to emerging technologies.*

Review condition of current software:

- Produce high-level data and process models and system context diagram of the Vista system.

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- Identify strengths and weaknesses of the current software in light of emerging technologies using 5 dimensions*.

- Rate the strength/weakness of the current software using 5 dimensions*.

Identify critical maintenance tasks and tasks critical to preparing Vista for a smooth transition to emerging technological innovations:

- Develop recommendations, using the 5 dimensions, to prepare Vista for emerging technologies.

- Produce prioritized recommendations for enhancements to Vista (e.g. System documentation, module interdependencies, security, support, resource usage, program upgrades, testing database conversion, etc.)

**5 dimensions: functionality (system architecture, ease of use, navigation and screen design, installation and user documentation), reliability (reliability, security and confidentially), performance and extensibility (system documentation, testability, structural coherence, development platform and environment, coding standards and support requirements)*

# Methodology

The evaluation used five generally accepted criteria important to organization mission-critical software. They include: functionality, ease of use, reliability, performance and extensibility (Appendix D). The project was not tasked with evaluating Vista against other similar products[1].

The findings discuss the strengths, weaknesses and recommended enhancements to the Vista software.

Input to the evaluation comes from interviews with PHSKC technical support staff, DOH technical staff, the Statewide Vista Coordinator, PHSKC project manager, three focus group sessions with Vista users, interviews with thirteen Vista Partnership members and Smith-McCann Computer Resources programmers and analysts. PHSKC provided Vista User interface code to the team for evaluation. In the interest of confidentiality, PHSKC allowed the team to view VistaCalculator code while at PHSKC. DOH provided access to all of the databases and text files. PHSKC also provided us with their Vista documentation. We examined all of the Vista user interface (VistaPHw.exe) code for use of outdated or obsolete VB statements and for use of the variant data type. In addition, we examined approximately 20% of the Vista's software code in detail and further evaluated in detail approximately 10% its global variables in order to determine adherence to generally accepted coding standards, variable and procedure scoping and appropriate use of global variables.

Unless noted otherwise, the recommendations are from the Smith-McCann assessment team.

[1] Refer to the Evaluation of State-Based Integrated Health Information systems for comparison of Vista to other assessment products.

# Findings, Conclusions and Recommendations

## *Vista should be supported and improved*

Vista is a software application that is important to the Public Health assessment community in Washington State. It provides vital assessment analyses that are difficult to produce using other products. For 57% of Washington State local health jurisdictions, Vista is the primary assessment tool used. Many people commented on ease of use, ease of updating, the data and statistics available, the fast speed and not having to work with SPSS as things they liked about Vista[2]. Vista is a software package that is valuable to Washington State public health and as such, should be supported and improved.

## *Vista has many strengths*

- Vista has very few, if any, issues with availability. Uptime is 24/7, whenever the DOH server is available. The application is also very stable and reliable
- The average response time is estimated to be 10 seconds or less, which is very good for an application performing complex calculations
- The new Vista user interface closely matches the old desktop version, making it easy for current users of Vista to learn the new web-based application.
- Based on information from the 2003 user survey and the user group sessions, Vista is providing vital assessment analyses that are difficult to produce using other products
- Despite issues with coding standards and structural coherence, the Vista code is in reasonable condition for an application of its age.
- On-line download of the updates improve the maintenance of a "fat client" application by automatically keeping it up-to-date. The update module is very easy to use.

## *Weaknesses are primarily in the area of maintainability*

- Most of the shortcomings of the software are in what we describe as "structural coherence". These shortcomings will limit the ability of a programmer to cost-effectively maintain Vista and will substantially increase the time and cost of training replacement programmers.
- The structural coherence of the user interface component is below an acceptable level. This is largely due to problems with scoping, naming convention and lack of system documentation.
- Important, generally accepted industry coding conventions are not being used.
- System documentation is minimal and needs to be completed.
- There is a need for more "in code" documentation of the Vista user interface code

[2] Vista 2003 Survey

## *Other weaknesses that could affect wider distribution*

- Microsoft Access is not a robust enough database management system for future expansion of Vista.
- Performance could degrade with wider use of Vista due to concurrency issues, server capacity and the use of Microsoft Access.
- Some LHJs restrict permission to install updates, making it difficult for users to be able to install the Vista updates. "Fat Client" architecture is more difficult to maintain for an application that requires frequent updates.
- The Vista user-interface does not follow current conventions for screen design, which may make it less appealing for wider distribution.
- User documentation is incomplete or needs to be updated for the new version.
- The Vista application-level help and error messaging is inadequate.

In our opinion, **Vista provides an adequate design for the functions that it is used for now**. It employs "fat client" architecture. There are no shortcomings of this architecture that should be a concern to DOH. The application is relatively simple to install and update the workstation components. However, this architecture does present a **workstation management problem** for the user for which there is no simple solution.

In terms of enhancing and maintaining the application, it appears that **Vista requires incisive knowledge of the modules and functions and how they interact with one another**. It is our judgment that this knowledge cannot be easily gained and will require long-term training and experience working with it. While this is largely attributable to a lack of documentation, more challenging for a developer is its unconventional coding methods. A programmer's ability to be effective and efficient depends on his ability to comprehend the code. **Steps should to be taken to clean up and improve the system's code structure**. We recommend the following improvements:

- Add documentation at the "code" level of detail.
- Refine and test changes to scoping and names.
- Clearly document module interdependencies.
- System diagrams, programmer documentation and comments embedded in the code are inadequate or non-existent. The PHSKC is aware of this shortcoming, however, and is now making an effort to document the application. This is critical, especially since the original developer will be retiring soon and the application will be turned over to another programmer.

In order to assure that the database will be able to support wider use, **the database(s) should eventually be converted to SQL Server** or some other "production" data. At the same time, the database design should be reviewed for improvements and the possibility of moving the local text files into the database should be explored.

**The application is stable and reliable**. The code is old, but we consider it, with some recommended improvements, to be an **acceptable base for further enhancements** over the next year or two. An eventual move to Microsoft .NET is recommended in order to take advantage of improvements in and to stay current with the technology. Microsoft .NET

technology supports both fat-client and thin-client applications and addresses the issue of the Vista version updates on client computers.

**We recommend spending 3-4 weeks "cleaning up" the code and then using conventional coding standards to develop all new modifications.** This will provide a .NET developer with a working prototype and with at least some modules that will be convertible form VB6 to .NET.

Since it can be used as a model for functionality, if not design, we see no disadvantage to complete the Vista conversion from the old desktop (Vista/PH) application.

## *Observations on Vista and .NET*

For the reasons of .NET's improved security features (including software upgrade/download transparency); potential for some automated VB code conversion/upgrade; and access to rapidly developing technologies that could be useful to Vista such as XML, Web Services and a robust internet-enabled architecture, we recommend pointing Vista development in that direction long term.

**Moving Vista to the Microsoft .NET platform is a significant task**. The user interface will need to be redesigned and developed. From initial examination, we believe Vista's current Calculator module can be used within a .NET solution. Further analysis is needed to confirm this.

One strategy for introducing .NET technology to Vista could be to **develop a stripped-down version of the system using "thin-client" architecture**, which would allow public users to have access to some of the Vista functionality. This "mini" Vista application could be developed using ASP.NET and VB.Net or C#.Net.

## Technical Assessment Recommendations

| | Immediate Need | Est | Complete within 1 year | Est | Complete within 2 years or Ongoing | Est |
|---|---|---|---|---|---|---|
| **Essential** | | | | | Design and develop solutions to ensure the completion of the conversion of numerator and denominator data, possibly making use of the new Vista custom data module. | 160 |
| | Complete the system documentation begun by PHSKC. | 80 | Perform a security audit on the Vista application | 8 | Research feasibility of converting the existing database structure from multiple databases and text files to an enterprise database such as SQL Server. | 20 |
| | Add documentation at the "code" level of detail | 80 | Upgrade Vista software programs including:<br>> Eliminating, demoting and incorporating variables into a procedure arguments. | 40 | | |
| | Refine and test changes to scoping and names | 40 | > Renaming variables using a variable naming convention that addresses scope and data type | 40 | | |
| | Clearly document module interdependencies. | 20 | Develop standardized software test scripts for Vista's most complex algorithms. | 40 | | |
| | Implement an "Issues Log" to track:<br>> Document Vista system "problem/incident" reports, severity, priority, and scheduled actions.<br>> Document future enhancements, priorities and scheduled actions<br>> History of actions and decisions on these issues. | 20 | | | | |
| | Begin monitoring database access/usage | | | | | |
| | Begin monitoring system resource usage. | | | | | |
| | Complete the development of Vista (VB 6) in order to include all required functionality of Vista/PH (desktop) in order to complete migration from desktop to web-based version | | | | | |

| | | | | |
|---|---|---|---|---|
| **Important** | | | | |
| | | Formalize testing procedures and environment(s) for Vista (if substantial enhancements are undertaken.) | 40 | |
| | | Initiate a process to record a "problem/incident" report. Would normally be used by help desk personnel. | | |
| | | Would be used to record new issues in "Issues Log" after Steering Committee review. | 8 | |
| | | Break the handful of very large procedures into multiple, appropriately scoped, small procedures | 120 | |
| | | Clean out old, unused code embedded in Vista's computer programs | 8 | |
| | | Study the feasibility of developing a web browser-based thin-client version of Vista, including ASP.NET. | 160 | |
| | | Install a test environment at DOH on a separate, dedicated server platform. | 16 | |
| | | | | Convert the existing physical database structure from multiple databases and text files to an enterprise database such as SQL Server. 120+ |
| | | | | Upgrade Vista's host server computer to prepare for wider use of the web-based Vista. 8 $4500 |
| **Desirable** | | | | |
| | | Convert imbedded SQL to stored procedures. | 80 | |
| | | Rewrite routines to eliminate GoTo logic and add On Error logic | 16 | |
| | | Upgrade antiquated Visual Basic code conventions version 6.0 to make the code easier to maintain and ready it for the eventual conversion to VB.Net. | 40 | |
| | | | | Develop a "stripped down" version of Vista using .NET and "thin-client" as a proof of concept. This could be used as a base on which to develop a full version of Vista. 500+ |
| **Total Hours** | **240** | | **618** | **808+** |

Note: These rough estimates of the time to complete are in hours, unless $ sign is specified

# 2. Functionality

## 2.1 VISTA USE

The current Vista provides a standardized method for conducting community health assessments on a range of topics by users with limited computer skills. It currently allows the user to analyze health indicators within customized geographic areas based on grouping of counties and produces statistics for eleven assessment topics (note, there are currently 12; however three topics are not yet implemented).

The original version of the application, Vista/PH, was a menu-driven desktop tool that used a commercial software package, SPSS, to perform calculations. The current version of Vista, VistaPHw, is an internet-based application that runs on the user's desktop. It utilizes a set of local files, as well as a set of databases on the DOH server through a PHSKC-developed component (VistaCalculator) that replaced SPSS. This component performs the calculations and selects and formats data for presentation. PHSKC and DOH are currently in the process of migrating Vista users from the desktop version (Vista/PH) to this new web-based version. Incomplete or missing data and problems with installing the user interface updates are preventing some Vista users from moving to the new version (VistaPHw). In addition, not all of the features available in the old desktop version have been converted in the new application. Unfortunately, records are not kept about which people are continuing to use Vista/PH.

The assessment topics are based upon standard health statistic data collected by the State of Washington. Analysis output is written to either a Microsoft Excel spreadsheet or to a simple grid "window" that allows data to be previewed, copied, or converted to a spreadsheet.

The primary Vista screen contains all of the factors required for a statistical analysis. A user selects the appropriate assessment topic and geographic area, and then chooses a time period and qualifying factors like races and gender. It is also possible to sort the results, by any of the analysis factors, and reorganize the output in a selected manner.

Three modules that are in the desktop version are not yet implemented in Vista. One of these is Case File Input (desktop version), which is currently being developed as the Custom Data Registration module for the web version, with functionality added. The other two modules are related to Census data. In desktop Vista, the 1990 Census data was accessible through 1990 Census Tables and Indicators and Social and Economic Status. They will be replaced with 2000 Census data modules. We have been told that is

not a top priority because of web-based access to other Census data that exists now (however, not as easy to use as Vista.)

**Strength:** Functional requirements have not been documented, so it is difficult to measure how well Vista meets the intended requirements. However, based on information from the user survey and the user sessions, Vista is providing vital assessment analyses that are difficult to produce using other products. For 57% of Washington State local health jurisdictions, Vista (VistaPHw and Vista/PH) is the primary assessment tool used. Many LHJs have access to other tools such as SPSS, STATA and EpiInfo.

**Weakness:** Some users are continuing to use the desktop version (Vista/PH) in order to be able to use features that are not yet available in the new version (VistaPHw).
**Weakness:** Although there is broad use of Vista by the Washington public health community, statistics have not been kept on the number of people who are still using the old desktop version, Vista/PH, so it is difficult to determine whether the new web-based version has been widely accepted.

## 2.2 SYSTEM ARCHITECTURE

The Vista architecture is a distributed, client-server model. This architecture is working well and appears to be well suited to Vista User's current needs. The primary issue with this architecture involves difficulties installing software updates on client machines.

Most modern web-enabled software uses the ubiquitous web browser such as Microsoft Explorer or Netscape. This "thin-client" solution has one principal benefit: a web browser is already available on nearly every desktop these days. This makes access via the internet straightforward and updates to the browser are handled by Microsoft. In Vista's circumstances however, since users must be authorized to access Vista services prior to use, pre-installed, "fat client" software is not an important benefit. The installation process for the Vista user is simple.

There is one issue concerning the increased security in newer desktop operating systems such as Windows XP. Vista users are required to install software components. Many users will not have the level of authority that these new operating systems require to install software and they will need to get assistance from someone who does.

**Strength:** The distributed, client-server (fat client) model used by Vista is working well and is meeting current user needs. Most users indicated that it is an improvement over the older desktop version.

**Weakness:** Some Vista users have difficulty installing Vista updates on their computers, due primarily to lack of administrator permission. There is no

solution to this problem except to either grant administrator permission or to ensure that IT staff will be able to handle the requests to install the fairly frequent updates of Vista.

**Recommendation:** Changing to thin-client architecture will be an expensive and time-consuming project, but may be worthwhile as a means to more easily encourage wider use of Vista. We recommend more analysis to determine which architecture will most effectively support Vista's functionality and user base. The Microsoft .NET environment will support both architectures.

## 2.3 DATA & PROCESS MODELS

The current Vista application is made up of five parts:

- **Vista User Interface (VistaPHw.exe)** is a software component that is installed on a Vista user's desktop. It provides the forms and screen dialogs that Vista users interact with to formulate queries. Once a query has been formulated, the component accesses the VistaCalculator software on DOH's secure server where the data is compiled. The Vista user interface component contains 40 forms modules plus 13 separate modules with 27,290 lines of code (however, at least 25% is inactive code). This report refers to this component as Vista.
- **VistaCalculator** is a software component that uses the query created by the Vista user interface to perform the actual calculations against several numerator and denominator databases on the server. The VistaCalculator contains 10 class modules with 13,186 lines of code.
- **Vista Update (VistaPHwUpdate.exe)** is a software component that automatically updates the user's desktop copy of the Vista user interface system whenever its programs change. It contains one form.
- **Vista databases** are a set of 11 Microsoft Access-based databases located on the DOH server. It contains all of the numerator and denominator data available to Vista. These databases summarize files extracted from a variety of sources, described below. See Appendix F, Data Model, for a description of this data.
- **Vista text files** include miscellaneous data needed to support the Vista user Interface and can be easily maintained by a non-technical administrator. An administrator can make new menu choices available to the user by simply changing these files. These files are downloaded from the website and installed on the user's desktop.

The user's desktop must be running Windows 95 or above. No other special software is required to support Vista on the user's computer.

Vista makes three types of requests of the data website, all handled by VistaCalculator.DLL on the server:

- Login request, which checks the user ID and password and returns the user's data permissions and a list of all text files, with folder name and date and time last modified.
- Text file request, which returns the data of a specified text file.
- Data request in the form of a Vista-proprietary "VistaScript" which specifies the data to be extracted and the rates to be calculated. It then returns those rates and associated statistics.

**Vista scenario:**

1. User downloads VistaPHw.exe from the web site.
2. User starts Vista and logs on to the web server using the user ID and password that was sent to the server administrator.
3. User selects an assessment topic and designs an analysis.
4. Vista generates script statements, which are sent to the web server for analysis.
5. The web server interprets the script, retrieves the necessary numerator and denominator data, and computes the requested rates, which it sends back to the user's desktop for display in Excel or grid.

See Appendix E for the context diagram and Appendix F for the data model.

# 3. Ease of Use

## 3.1 NAVIGATION AND SCREEN DESIGN.

Navigation in Vista is handled by a series of menus presented on the main processing form. The application is designed to "prompt" the user through the process of designing an analysis package. As the user makes a selection(s) in one menu, other menus are automatically made available. The idea is to step the user through the process until enough information has been selected to be able to create an analysis.

In the user group sessions, users who identified themselves as frequent or "power" users reported few problems with this approach. Less frequent users indicated that they have some trouble understanding or remembering how to use the screens.
There were no requests for major changes in the screen design and most users are satisfied with the way the application works.

We believe, however, that the navigation and screen design limit the application for wider adoption. Users today expect professional applications to have "look and feel" typical of, for example, Microsoft Windows applications with menu bars, tool bars, use of system colors and "full-screen" presentation. The benefits of a conventional user interface are more than just

esthetic since familiarity will reduce training time and improve users' effectiveness.

**Strength:** The new Vista user interface closely matches the old desktop version, making it easy for current users of Vista to learn how to use the new web-based application. In the User group sessions, many users stated that they also like being presented with only one screen.

**Weakness:** Less frequent users indicated that they have some trouble understanding or remembering how to use the screens.
**Weakness:** The Vista user-interface does not follow conventions common today for screen design, which may make it less appealing for wider distribution.

**Recommendation:** The application's user interface should be reevaluated for opportunities to simplify it. For example, an "additional" user interface that could use the underlying code would guide new and infrequent users through constructing a query. This could be similar to a Windows "wizard" or have a "Turbo-tax"-like look-and-feel and would employ current Windows design standards. Current users would have the option of using it or using the current "classic" user interface.

## 3.2 INSTALLATION

Vista Update (VistaPHwUpdate.exe) is the component that automatically downloads revisions to the Vista's desktop component, Vista User interface (VI). It contains one form and is straightforward and easy to use.

However, as discussed in 2.1 System Architecture above, many Vista users on newer operating systems do not have "administrator" rights for the PC they are using, so they are not allowed to load the update and must instead contact IT staff which can result in delays. This has proved to be a problem, especially in the smaller local health jurisdictions where, according to the users, IT support staff availability is often limited.

**Strength:** On-line download of the updates make it easier to keep the application up-to-date, and the update module is very easy to use.

**Weakness:** In order to install the update, some users must have "administrator" rights for the PC they are using. In many local health jurisdictions, this permission is restricted, so some Vista users are not allowed to load the update and must instead contact their IT staff.

**Recommendation:** (See 2.1 System Architecture recommendation.)

## 3.3 USER DOCUMENTATION

User documentation refers to readily available aids that assist a user while using Vista. This includes references like how-to booklets, Internet web pages, help screens, and tool tip mechanisms.

The user manual is out of date and needs to be updated. We reviewed the "Quick Reference" guide that is available online and feel that it provides a good overview of Vista and provides easy to understand instructions on its use[3]. There are now also some on-line exercises that the user can download and try.

The only assistance built in to the software seems to be the "help" and "?" buttons on the screens. A particular Help button provides specific information about the item/option that it is next to but is sometimes little more than a definition. There is no general, overall help available within the application about how to use Vista. Many of the users can't get the answers they need using those buttons.

**Strength:** The documentation that is now available provides a good overview of Vista and provides easy to understand instructions on its use.
**Weakness:** The user manual is for the old desktop version of Vista and needs to be updated.
**Weakness:** The Vista application-level help is inadequate.

The following recommendations are from the User group sessions.

- Develop broad or in-depth help in addition to the existing specific help for a particular menu or button.
- Develop a help note for each button that includes an explanation of when to use that button.
- Use either "help" or "?" to identify the online help, not both.

**Recommendation:** Update the Vista user manual to reflect the changes for the new version of Vista.

**Recommendation:** Participants of the User group sessions were unaware of web-based training enhancements. Improved publicizing may be necessary to reach the target audience.

**Recommendation:** Over time, add meaningful application-level help to Vista, including using pop-up error messages when the user has made an invalid selection or entered invalid data.

[3] See http://www.doh.wa.gov/os/vista/homepage.htm for a copy of the "Quick Reference" guide.

# 4. Reliability

## 4.1 Reliability and Availability

Reliability means the software works as designed and any failures are detected and gracefully handled without abruptly or uncontrollably shutting Vista down and without affecting other users.

Availability describes the extent to which Vista is available for use as scheduled.

Vista has very few, if any, issues with availability. Uptime is 24/7, whenever the DOH server is available. Some network-related incidents (known as "time outs") were mentioned in the user group sessions; however, these are attributed primarily to slow servers at the local health jurisdiction. See Appendix I, Update Log.

According to PHSKC and the DOH/CHS network administrator reliability has also not been an issue and there have been very few problems reported to them about the application. Some of the users reported in the User group sessions that Vista does sometimes crash, and that when it does, it is often hard to determine the cause. Also, selecting certain assessment topics that "aren't really available" was cited as one way to cause Vista to crash. Some users also complained the application would sometimes stop responding (i.e. "timing out"). This seems to happen with a very complex analysis request and inadequate or slow local servers was offered as a possible reason.

The DOH network administrator did mention that there is a potential "concurrency" problem that is associated with multiple users accessing the application on at the same time. This has occurred once, during a class when 14 students attempted to run the same analysis at the same time, which caused the system to "hang" awaiting resources. There are no statistics maintained on Vista "uptime" and no documented error log, so our information is anecdotal. However, since it comes from both Vista support and the Vista users, it should be taken into account.

Another problem that concerned some users in the user group sessions is that the application does not shut down properly but instead continues to run "in the background" after closing. This is a recorded problem at PHSKC and a fix has been developed and loaded to the web for customers to download (see Appendix I, Update Log).

**Strength:** Vista has very few, if any, issues with availability. Uptime is 24/7, whenever the DOH server is available.
**Strength:** The application is reasonably stable and reliable.

**Weakness:** A concurrency problem arose during a class of 14 users. This occurs seldom or never in production, however it could become more of an issue with wider distribution and use.

**Recommendation:** Examine VistaCalculator software to assure it releases all resources promptly. We estimate that the Vista developer could do this in a few hours.

**Recommendation:** Vista administrators should begin to regularly monitor database access. The current database software, Microsoft Access, cannot reliably manage more than about 10-15 concurrent users at which point performance begins to quickly degrade.

## 4.2 SECURITY & CONFIDENTIALITY

Users are assigned an ID and password by the Vista administrator. This restricts access to the database to authorized users only. Each Vista user accesses the DOH data source and site by using the authorized account ID, password and data permission that is assigned by DOH.

Security within the application is provided by encryption. Encryption scrambles the stream of data passing between computers and is invoked during the connection between the desktop portion of the system and the server portion (VistaCalculator). PHSKC's developer selected a commercial product that was then modified to make the encryption unique to Vista. Data is encrypted at both ends of the process: 1) when Vista sends its query to the VistaCalculator on the server as well as 2) when VistaCalculator returns its results.

We did notice during our review of the desktop code, that a user ID and password was contained within the code itself and is visible to anyone who can see or reverse engineer the code.

**Recommendation:** If this ID and password enables any degree of authorization, it should be removed to an encrypted file to improve security.

**Strength:** Vista requires sign on with a user identifier and password. The developer took security seriously with encryption. Use of a commercial encryption product helps ensure a robust solution.

**Weakness:** No security weaknesses were noted; however an independent security audit of the calculator DLL has never been performed.
**Weakness:** Code must be maintained for encryption and decryption routines that may not be necessary if the application can be developed to take advantage of the industry standard Secure Socket Layer technology.

In Vista, the developer has already built in a feature to assign a "security level" with every user login. DOH can then set authorization levels for accessing numerator and denominator data. Right now all of the users are Vista coordinators who need full access. This feature is currently not being used but was developed to handle the case of an expanded user base.

**Recommendation:** A security audit is beyond the scope of this report. However, we believe that a security audit should be performed on the Vista application, especially the VistaCalculator component. VistaCalculator resides on the application server and is a "DLL" and has never been examined by DOH staff to assure it uses the only computer resources required to perform its job. This type of module becomes almost part of the operating system and can have privileges that other application processes may not. One possible check involves finding out if any function accesses both system resources (storage devices and memory) directly and the web. Another is to examine it to determine if it is susceptible to manipulation or abuse by an external entity (hacking). This audit ideally should be performed by the DOH organization that is hosting the application since they are intimately familiar with the environment.

**Recommendation:** Research feasibility of making use of the built-in security available features of SSL. This would remove complex code from the application and hence a need to maintain it.

# 5. Performance

As with reliability, users are satisfied with the Vista performance. Some of the speed is attributed to the fact that numerator and denominator databases contain aggregated data which greatly reduces the volume of data Vista needs to process and thereby improves performance. Vista can create a very complex analysis very quickly. According to the PHSKC support staff, the most complicated calculation takes less than 30 seconds and the average response time is estimated to be 10 seconds or less. However, neither DOH nor PHSKC maintain statistics on response, so this information too is anecdotal.

The VistaCalculator and databases are running at DOH on a 266 MHz server. This server has been adequate to run the application and maintain performance to date. However, the network administrator expressed concern that a faster server will be needed soon as wider use of Vista becomes a reality.

**Strength:** The users are very satisfied with the Vista performance. The average response time is estimated to be 10 seconds or less, which is very good for an application performing complex calculations.

**Weakness:** Performance could be affected by wider use of the application. This would be primarily due to competition for limited resources.

**Recommendation:** As with the database, Vista Administrators should begin monitoring usage of system resources for purposes of identifying and planning around peak usage. Upgrades can then be anticipated before they become a problem.

**Recommendation:** In order to prepare for wider use of the web-based Vista, the server on which the VistaCalculator and the databases reside should be replaced. Server prices vary from an extreme low of approximately $300 to $6000 or more. A reliable, dual-processor server that can facilitate non-stop, 24/7 operation can be purchased for $2500-5000. The old server could be retained and set up to support a Vista test environment.

# 6. Extensibility

**Extensibility** describes the ease with which the system's programs can be effectively corrected and new functionality added to enhance Vista's features.

A programmer's ability to effectively and efficiently maintain and enhance a system depends on his ability to comprehend the code. Software code can be made much easier to understand with documentation such as diagrams, and with generous use of narrative commentary -- often within the program itself. Additionally, comprehension is greatly increased when a complex program is carefully organized into a series of small, self-contained pieces by applying concepts such as of functional decomposition and scoping.

**Strength:** We believe Vista code is in reasonable condition for a system its age and with recommendations described below, the application can be healthy enough to allow further updates to be made to it.

**Weakness:** Most of the shortcomings in the code are in the area of extensibility, particularly in what we describe as "structural coherence," and primarily affect the Vista user interface (VI) component. These shortcomings are not fatal and we believe they can markedly be improved with a 4-6 week investment of programming improvements.
**Weakness:** Adherence to industry coding standards is weak; in particular, the excessive use of "GoTo" statements to create processing loops.

The recommendations made below are based on our understanding that Vista is expected to undergo substantial changes and enhancements and remain a foundational system for Washington public health agencies for many years to come.

## 6.1 SYSTEM DOCUMENTATION

System documentation is important for transferring knowledge between Vista developers. It describes system functionality at various levels of detail and contains artifacts of issues, decisions and solutions.

Vista's System documentation is minimal and is a serious impediment to maintaining the application once the original developer retires. However, the PHSKC staff has begun developing this and has indicated that it has a high priority.

System documentation currently being developed at PHSKC includes:

- A comprehensive description of the scripting scheme used by the application. This document is reportedly complete.
- Specification and procedures for building a data website so that those requests can be properly handled by VistaCalculator.DLL. This documentation appears to be completed.
- A technical overview of the Vista applications, along with detailed descriptions of the purpose and logic of each Vista form. This document has only recently been started.

System documentation developed by this team includes:

- High-level context diagram (see Appendix E)
- High-level data model (See Appendix F)

Several discussions that follow recommend additional documentation that we believe should also be included to enhance PHSKC's.
Typically, much documentation is found within the program code itself as commentary. VI code contains very few descriptive comments of purpose, coding practices, etc. Embedded comments can improve the maintainability of the application by helping the maintenance programmer understand functionality and complex coding techniques.

The VistaCalculator (VC) component of Vista is significantly better in this regard. Portions of many of its more complicated program interfaces are well described along with several well-written procedure descriptions. VC has abundant in-code commentary.

**Strength:** The Vista group recognizes the importance of documentation and have allocated time and funding to complete that task.

**Weakness:** Currently system documentation is minimal and needs to be completed.
**Weakness:** There are few imbedded comments in the Vista user interface code. Good "in code" comments help maintenance programmers understand the immediate code.

**Recommendation:** Upon review of several VI programs, we believe documentation at the "code" level of detail is extremely important and should be further documented with support of the original developer.

**Recommendation:** The documentation that is currently being developed looks as if it will be adequate once it is completed, but this activity must be made a priority as a new programmer is now taking over maintenance of the application.

## 6.2 TESTABILITY

Testability refers to the capability of the developers to effectively and efficiently determine that the software accurately provides the services and information required by its users. Testing should be performed after every non-trivial change to the software.

PHSKC has the responsibility for system testing the application itself before it is released. There are no documented testing procedures or standard test scripts. The developer does perform unit testing on a local version of the application before an update is sent to DOH. At DOH, there is not a separate test server, so the updates are then loaded directly to the production server.

**Strength:** No significant history or pattern of software failures that would indicate lack of testing.

**Weakness:** No documented testing procedures for the application.

**Weakness:** Any non-trivial enhancement or repair to the Vista user interface component could prove to be very difficult to effectively test due to the fact that the code is not well structured and "scoped".

**Recommendation:** While we uncovered no significant history or pattern of software failures, PHSKC should formalize testing procedures and environment(s) for Vista if substantial enhancements are undertaken. This is a best practice for software management and with staff turnover and distribution of responsibilities, continued software quality can be ensured with a reasonable testing regimen. Many models and software tools are available that can be adapted to PHSKC and Vista's particular needs. The goal will be to assure changes are adequately tested, validated and approved before deployment to the customer community.

**Recommendation:** Modern systems, especially those that are large, complex and/or security sensitive, increasingly maintain standardized test scripts for regression testing. Because of its complex nature, both in creating queries as well as computing statistics, some standard scripts should be developed for

evaluating Vista's most complex algorithms. Such scripts would identify standard input scenarios and expected results.

Generally, we believe that for any non-trivial enhancement or repair, the VI component would prove to be very difficult to effectively test due to the fact that the code is not well structured and "scoped" (see 5.3.3 Scoping below). A system's structure and scoping affects the ability to isolate changes and simplify testing. Ineffective testing leads to higher than expected rates of errors in production. Although not a problem today, it is more likely to become a problem in the future as the responsibility is transferred to new programmers.

This observation would exclude enhancements that could be considered "add-ons". For example, a new or purchased program can be incorporated by simply adding it to a menu.

**Recommendation:** Structure and scoping recommendations are discussed below.

**Recommendation:** Install a test environment at DOH on a separate, dedicated server platform. This could be used to test both the application and the data. If a new production server is purchased, the current Vista server could be used as the test environment server.

## 6.3 STRUCTURAL COHERENCE

Structural Coherence is the degree to which the various parts and pieces of software that comprise Vista are reasonably organized into functionally related groups with clear purpose and responsibility. A programmer can more readily and inexpensively learn, change and test a coherent system. The importance of structural coherence increases as programmer turnover rate increases.

Our findings are based on detailed examination of 9 of Vista User Interface's 53 modules and a visual inspection of 5 of VistaCalculator's 10 "classes". Some modules were chosen according to their apparent importance to the application and some were chosen at random. Notes concerning each chosen module are in Appendix G. We also made a cursory examination of most of VistaCalculator's "classes."

Coherent systems tend to become incoherent with age. Contributing factors include the accumulation of "quick fixes;" programmers' incomplete understanding and recollection of the system; and programmer turnover.

Despite VI's age, it continues to have good structural coherence at a high level. At the programming code level though, coherence breaks down in several ways,

which we discuss below. While it is important to rectify these weaknesses, they are not fatal flaws.

**Strength:** High-level structural coherence of the Vista user interface is good.

**Weakness:** On a scale of 1-5, where 5 is excellent, we believe Vista Interface's structural coherence at the programming level is about 1-2. This is largely due to three coding characteristics described below: Scoping, naming convention and lack of system documentation.

**Recommendation:** Given approximately 3-4 weeks to refine and test changes to scoping and names, we believe a programmer would be able raise VI's maintainability to a 4 on the scale of 1-5.

VC's structure is also very clear at a high level. Its 10 classes are well named to follow a procedurally-focused purpose. The main module, VistaCalc, is very large and its maintainability would benefit by decomposing it into smaller, more manageable pieces.

**Strength:** High-level structural coherence of the Vista calculator is clear.

**Weakness:** The main module is very large and could be unmanageable.

**Recommendation:** Although names and scopes are comparatively better than VI's, 1 week of refinement and testing of VC would substantially improve its maintainability as will re-factoring large procedures.

### 6.3.1 MODULE COHERENCE

VI's desktop subsystem contains 53 modules (40 forms and 13 supporting modules) and hundreds of individually named procedures known as subroutines and functions (referred to below as procedures).

Each of the 40 form modules produces one of the forms familiar to Vista users. Each has a clear purpose that is easily identified and understood by a programmer.

Most of the supporting modules appear to be companion modules to a similarly named form module. The organization and purpose for those appear clear as well. Two support modules provide a variety of general-use system procedures, and data variables, and are well named.

VC contains 10 "class" modules. Each is clearly named to reflect its procedural purpose. Like VI's modules, each contains individually named procedures known as subroutines and functions.

### 6.3.2 PROCEDURES

We could not assess the structural coherence of VI at the procedure-level, primarily because of the nature of the variable names used in its procedures (discussed below) and the many globally-declared variables and procedures. These two conditions dramatically increase the complexity of understanding code. The lack of conventional naming masks the activity of a procedure and whether it affects programs beyond its module. The large number of global variables and procedures masks the ability to understand the behavior of the system overall.

Nearly all systems use global variables. The number in VI is unusually large. We believe this could be a significant maintenance and training challenge. To get an idea of how they are used, we examined 29 of the 300 global variables (see Appendix H) and determined that a large number of these could be eliminated, or demoted to a local- or module-scoped variable, or incorporated into a procedure argument. Doing so would significantly simplify a programmer's ability to understand VI code, especially if the variables were renamed at the same time (see "Naming Conventions" below).

VC coherency at the procedure level appears good to very good. VC has only 10 "class" modules, which are instantiated in dedicated procedures of one of its modules (VistaCalc). Procedure names are all descriptive. More extensive use of procedure parameters helps clarify purpose and usage.

The size of several VI and VC procedures is too large to readily manage. For example, in VI's Main.frm, there are two routines. Each requires more than 15 screens to display all of the code. Several procedures in VC were more than 15 screens with one of 30 screens. While this is not typical of Vista, it does create unnecessary complexity. General principles are to always keep procedures to between 1 and 2 pages for readability.

**Recommendation:** Break the handful of very large procedures into multiple, appropriately scoped, small procedures. Some assistance from the original developer could be helpful here.

In VI, we observe many procedures that directly change the behavior and variables in other modules. This is not unusual, but design

principles place strong constraints on when and how this should occur. PHSKC's current documentation task with the original developer should help clarify these module interdependencies.

We did not see such evidence in VC. VC exclusively uses "class" modules, which reduces the likelihood of this problem. VC leaves the door somewhat ajar however by defaulting a preponderance of its procedures to public scope.

**Recommendation:** Clearly document module interdependencies.

### 6.3.3 SCOPING

A discussion of scoping is beyond this report; however scoping is a feature of modern software languages including Visual Basic and is an important concept for improving a system's coherence. Scoping (and its cousin "visibility") is a characteristic assigned to an application's procedures and variables whose purpose is to discretely hide unnecessary details from an application's many component parts. We recommend the Vista development team research this.

VI contains nearly 300 global variables and an uncounted number of "public" procedures and functions. Custom (i.e. non-VB-generated) procedures are almost all written with public scope, as are all procedures in the 13 general-purpose modules. This scope makes each of them candidates to be accessed by any procedure in the system. Because they can be does not mean they are, however this introduces doubt in the mind of a new programmer about what the system is actually doing and can add extra burden when analyzing code for changes.

Placing proper scope on procedures and variables (e.g. global & public; module; local & private) has the potential to dramatically reduce the time to thoroughly understand the system and the cost of maintaining and testing it.

VC code has much-improved scoping and variable definition. Several of the class modules utilize "option explicit" and more extensive use was made of procedure parameters. Nevertheless, VC coherence can significantly benefit by adding appropriate scope to all procedures and adding a naming convention that declares the scope. While class modules are not using "global" variables, the enormous size of VC's main class, 7500+ lines of code, makes all of its 68 private class variables tantamount to globals. Similarly, some of the procedures within the module are extremely large, up to 30 screens. This makes their "local" variables available to a very large amount of code.

**Recommendation:** Examine VI and VC variables, especially "global" variables, and eliminate, demote and incorporate into a procedure argument where appropriate. Such a task could be easily performed in a piecemeal fashion over time. Assistance from the original developer would not be needed.

### 6.3.4 NAMING CONVENTIONS

Many naming conventions have been developed over the years to improve coherency and facilitate construction of well-designed systems. Without well-named modules, procedures, controls, and program variables (i.e. a program's holders of facts such as names and addresses), even a coherent design can appear as a foreign language to a maintenance programmer.

In Vista, the modules appear to be well named. VI's names are abbreviations, but we located some program code that enabled us to translate the abbreviation into a purposeful name. Abbreviations are an important naming convention concept.

VI's procedure names are generally adequate with VC's being especially clear and descriptive. As is typical in most systems though, improving descriptive names, in many cases, benefits a maintenance programmer. To improve coherence, globally available procedures, like those available in VI's UTIL.bas and Vista.bas, should explicitly be given global names.

The largest hurdle in Vista code we believe will prove to be the absence of a consistent convention for naming program variables -- including form controls.

Variable naming conventions typically address two aspects: 1) a variable's type such as integer or string, and 2) a variable's scope. Scope is a basic concept enforced by the visual basic language. While too complex to discuss here, it is an important concept that improves the ability of a programmer to easily recognize what a program is trying to do. With Vista's use of several hundred globally-scoped variables, a programmer could find it a challenge to fully understand the behavior of the system as a whole.

Extensive use of undeclared variables and non-scoped variables together with the use of nearly as large a number of global variables will, we believe, make it very challenging for a programmer to confidently determine how and where a variable is maintained. For

example, GENFSzip is an undeclared variable in at least two different modules. Without researching it each time, a programmer may be prone to assume it's global since by name it is used in an undeclared fashion in more than one module and without researching it you cannot be sure what other aspects of the application may have set its value or may use its value.

**Recommendation:** Rename variables, particularly module and global variables and control objects, using a naming convention that addresses scope and data type. These changes can and should be made. They can be completed in a piecemeal fashion over time without assistance from the developer.

### 6.3.5 CODING STANDARDS

Systems that follow conventional coding standards improve coherence. Coding standards are determined by the level of adherence to accepted standards for Visual Basic.

"Practical Standards for Microsoft Visual Basic" by James D. Foxall, Microsoft Press, provides a set of standards that can be used to develop Visual Basic programs.

See Appendices 3 and 4 for details on issues with coding techniques and adherence to coding standards.

**Strength:** The Vista application benefits from being coded by primarily one person throughout its life cycle. It is fairly consistent in the style of coding which enables another programmer to more easily learn the application.

**Weakness:** Code is difficult to understand and appears to be unnecessarily complex due to unconventional coding techniques.
**Weakness:** Adherence to industry coding standards is weak. Examples include: lack of use of Visual Basic's error handling; use of DefInt rather than declaring variable types; use of single line IF statements; inconsistent freeing of resources (use of Nothing); use of straight-line code with embedded GoTo/GoSub statements to create processing loops within complex code; as well as examples discussed earlier including: use of global functions/subroutines to change form controls; use of short, cryptic function/subroutine names; use of undeclared variables; inappropriate global activity; no scope or type naming convention for global variables.

**Recommendation:** The Vista development team should agree on standards to use and then apply those standards to all new code that is developed. There are books available that outline generally

accepted coding standards and there is a lot of information on the Internet.

**Recommendation:** Beyond specific earlier recommendations, further re-development to apply coding standards would be impractical and not cost-effective. Applying industry standards when performing other maintenance tasks on existing code would be worthwhile and feasible.

### 6.3.6 General State of the Code

During the life of an application, as code is added and replaced, the tendency is for maintenance costs to increase due to 1) reduced coherency of the design and 2) a clutter factor due to spurious code remnants and redundant functionality.

We were unable to determine the degree of redundant functionality. This type of knowledge comes slowly over time and with experience. Our expectation though is that Vista probably has less redundancy than other systems its age because the original developer has always been available to maintain its conceptual integrity.

With respect to spurious code, we found much old, inactive code in Vista (i.e. "commented out"). Most could be classified as historical documentation -- as described in the documentation section above. For example, the recent replacement of SPSS led to large remnants of SPSS code that would, we presume, enable the programmer to monitor that the new functionality satisfactorily replaced the old. This could justify the remnant code's continued existence -- for a period of time.

We also discovered that a large percentage of VI's global variables were no longer used. Of the 29 in our sample evaluation, 11 were no longer used. This could be an indication that there is at least some unused code that could be removed to improve maintainability.

**Recommendation:** We recommend a sweep, as time allows, removing old, unused code in order to improve readability.

## 6.4 Development platform and environment

The development platform the system is based on is Windows 2000, Microsoft Visual Basic 6.0 and Microsoft Access 2000 (with Jet 2000).

**Strength:** The development platform is a standard Microsoft platform that is suitable for current Vista development.

**Weakness:** Case or other design tools are not available to the programmer. Design and maintenance of the application may be improved with the user of appropriate tools.

**Recommendation:** An eventual move to the .NET development platform could be required because over time Microsoft will provide less and less support for an older platform. We do not see an immediate need for a move to the .NET platform. However, in order to give the developer time to learn the new environment, we suggest purchasing and installing Visual Studio .NET within a year. Both VS.NET and VS 6 can reside and run on the same computer, so this will not affect the current development platform.

**Recommendation:** Plan for the eventual conversion of the MS Access-hosted databases to Microsoft's SQL Server or similar enterprise-level database management software. SQL Server provides improved security, performance, reliability and administrative tools and, more importantly for Vista, can serve hundreds of users compared to MS Access' 10-15 concurrent users. This would involve, as a first step, designing the new database, which should include not only the current Access tables, but also the Vista text file lookup tables.

## 6.5 SUPPORT REQUIREMENTS

The Vista application needs skilled staff support to maintain and enhance the software and to convert and load the numerator and denominator data in a form that is usable by the application.

Currently direct support is provided by PHSKC and DOH.

- An annual total of approximately $150,000 is funded through partnership dollars associated with the Local Capacity Development Fund. These dollars are used to support software development, hardware and software investments at the local level, Vista and related training, a .5 FTE for Vista administration, including testing and converting the data to Vista format.
- In addition, DOH/CHS provides network administrator support for Vista by allowing the CHS administrator to handle Vista in addition to his other duties.
- PHSKC and CHS are providing significant support from other funding streams when the Vista budget cannot cover. Last biennium PHSKC provided $95,391 for last biennium, mainly to pay for a programmer and oversight by David Solet. DOH/CHS estimated that they provided approximately $5990, mostly for the Vista coordinator's time
- DOH also provides funding that is used to provide numerator data to Vista.

It was pointed out that most of the other assessment tools that are available take about $300,000/year to support. For example, MassCHIP has budget of $268,954/year to support it; Mica has 4 full-time FTEs; and the IBIS budget is $250,000/year in addition to two "in-kind" FTEs at the state.

The CHS has also asked for some support for their network manager in order to be able to provide the support needed for the Vista server and production environment

**Strength:** Staff are well qualified and skilled software development experts. All of the support staff that we met with are very dedicated to the application and to providing support services to the Vista community.

**Weakness:** Vista's one and only developer has retired and left a substantial knowledge gap for the ongoing administration and enhancement of Vista. There is one programmer at PHSKC to support the application, and he has some other duties besides Vista. At DOH, the Vista coordinator needs to be able to spend her time getting the data loaded and converting user documentation, and yet must spend half her time on non-Vista duties.

**Recommendation:** Research funding a Vista data coordinator to manage the provider contacts, provider source files, conversion of source files to Vista format and the Vista databases and text files.

# 7. Vista Data Components

Vista's data components consist of a set of text files, access databases and conversion routines and procedures that create aggregated datasets from data provided by a number of government sources. Vista data is stored in a pre-processed state (aggregated) in order to reduce the compute time needed to perform the calculations.

A new Vista component is currently being developed, the Custom Data Module. It will convert numerator data files from a user format to the Vista format for use by the Vista user interface and calculator. This will expand the number of assessments that will be available to the users and will allow them to use Vista as a tool to work with their own data.

## 7.1 VISTA INPUT DATA

Several government entities provide files of the raw data used to create the aggregated Vista numerator and denominator table data. These data source

providers are listed in the Vista text file, DataSources.txt that is part of the Vista application. (See Appendix J.)

The Vista user interface loads data for its menus from local text files stored in the Vista folder. These local files provide Vista with a simple way to create dynamic lists without requiring the overhead of making a data request to the server. They are managed by the Vista administrator and can be modified as it is necessary and then included in the latest Vista update.

The Vista calculator accesses several Microsoft Access databases that reside on the DOH server. These are the aggregated numerator and denominator tables containing assessment "topic" and population data.

**Recommendation:** Research the cost, feasibility and benefits of moving Vista's nine separate Access databases and local text files into one enterprise-quality database such as Microsoft's SQL Server, Sybase or Oracle. We believe this upgrade would be relatively straightforward because of the methods VistaCalculator uses to access its databases now. Due to our limited access to VistaCalculator's programs, further research is needed to properly estimate such an effort.

**Recommendation:** Imbedded SQL can be difficult to maintain. Research feasibility, cost and benefit of converting imbedded SQL in the VistaCalculator to stored procedures.

## 7.2 DATA ACCURACY AND RELIABILITY

The "raw" input data must be converted to Vista format and aggregated before it can be used by the application. The provider file formats often change from year-to-year. This complicates the conversion process because the conversion "scripts" need to be redesigned, developed and tested. Additional staff may be required to help with these conversions in order to prevent further delays providing the application with current data.

According to the DOH Vista Administrator, Vista currently has the least access to critical current data since its inception. The 2000 population data from the census, the source of the Vista denominator data for 2000, has not yet been used to create postcensal (2001- ) estimates below the county level. As a result, the zip code level is not available for years from 2000 forward. Intercensal years (1991-1999) must also be redone to take into account the 2000 Census population. We were told by the Vista administrator, that hospitalization data is lagging one year behind the current year and the unduplicated hospitalization data (EPI file) is lagging even further behind, and that complete data is only available through 1998.

A current data issue, at the time of this report (June 2003), has to do with race categories in the denominator data. The 1990 census used single race categories; however the 2000 census was changed to use multiple race categories. This causes a problem when performing calculations because the numerator and denominator classifications do not match. We have been told this issue is in the process of being resolved, but it is an example of the difficulty and complexity encountered in creating the aggregate data.

We were told that the DOH Vista partnership understands what is needed to complete the data conversions, but no one has been hired yet to do the work.

The new custom data module may be able to address at least some of the conversion issues for the numerator data. It appeared from the quick demonstration, that the output dataset is meant to be a local file, stored on the user's computer. However, this feature may also provide an automated way for the Vista administrator to format a text file for Vista that could then be "imported" into the appropriate Vista database table.

**Weakness:** Our understanding is Vista has the least data available to since it was first developed. We were also told that keeping track of all of the databases is difficult and time-consuming and that there may be a need for some additional support. This is an important issue that we were not able pursue. We would advise researching whether this data problem is due to availability of data, to a staffing shortage or to priorities.

The DOH administrator is responsible for testing new releases of Vista aggregate data. With the desktop version some test procedures had been set up to validate the data. The providers of the data used those test procedures to produce output results from their systems that could then be compared the Vista conversion results. This testing is conducted by the providers, because they are more familiar with their data and are therefore in a better position to crosscheck the results. Data verification procedures have been developed for the some of new data that needs to be converted, but this task needs to be completed for all of the data source files.

**Recommendation:** Develop and document verification scripts or procedures for all Vista conversion routines to ensure that the conversion routines are working correctly.

## 7.3 DATA STANDARDS

There are essentially no data standards in place for the data tables that providers send to Vista. Vista data providers do not use the same format every year. This causes problems during aggregation as the data will not install and the administrator then needs to go back and ask for change to be made in the source file, which delays the conversion process.

**Recommendation:** The Vista partnership should formalize agreements with provider entities to standardize data files including standard field definitions and, where appropriate, standard field names. This is an issue that is difficult to solve because it is not easy to convince another division or agency to redesign and develop processes that are already in place and working in order to format data for another entity.

## 7.4 VISTA CUSTOM DATA MODULE

Custom data model is a visual basic application that will be used to convert end-user datasets to the Vista format. It will provide users with a simpler method for importing data files that are not currently standard to Vista.

The PHSKC developer has finished the design phase for the Custom Data Module, and is now working on the final application version. He estimated that it will take between 1 and 1-1/2 months to complete, which would make it available for use sometime in August 2003. That estimate assumes that he will be able to spend most of his time on the module. The Custom Data Module is being developed in VB 6.0 and will be part of Vista. The users will be able to access it by downloading a Vista update.

The custom data module feature of formatting a local file to be used by Vista may not convert easily to "thin client" architecture. This feature needs to be carefully reviewed and weighed before making decisions to redevelop Vista as a thin-client application.

The Vista assessment team has not inspected this module and an evaluation of it is outside the scope of this assessment.

**Recommendation:** Custom data module needs to be researched to determine if it is a good candidate for conversion to "thin-client" architecture. If the user's file needs to be stored on the local computer, this may not be the case

## 7.5 CONCLUSIONS

Vista was developed to provide the Washington state public assessment community with a tool to analyze health data. Without accurate and up-to-date data, the ability to conduct meaningful assessments is reduced or lost. Vista relies on data from many sources to build its tables and the providers of that source data have apparently not always been consistent. This is especially true for the denominator data.

Conversion routines are required to prepare the source data for use by the Vista calculator. Because the format and organization of the input data is not static, the conversion routines require frequent redevelopment. Managing the

data components is an important but difficult and time-consuming job that needs more attention.

## 7.6 RECOMMENDATIONS

- Develop a test script or procedure for each set of data that needs to be converted for Vista.
- Research the feasibility of converting the tables that are spread across several, separate Access databases into one enterprise-quality database such as Microsoft's SQL Server, Sybase or Oracle.
- If feasible, within the next two years design the new database structure and convert the existing database(s) and text files to an enterprise-quality database.
- Research whether the problem of the availability of data in Vista is due to availability of data from the providers, to lack of providers, to a staffing shortage or to priorities.

# Disseminating Vista Outside Washington State: A Case Study

### *Sharing Washington State's Community Health Assessment Tool*

# Introduction

In November 2001, Multnomah County Health Department (MultCo) in Oregon State contracted with Public Health Seattle and King County (PHSKC) in Washington State to receive Vista - software for community health assessment. In October 2002, Washington State Department of Health (DOH) and Oregon Department of Human Services, Health Services (DHS) formed a partnership through the Assessment in Action (AIA) federally funded CDC grant to evaluate the piloting of Vista in MultCo and transfer Vista to other county health departments in Oregon.

Oregon's first year goal was to establish the partnerships and infrastructure necessary to plan, implement, and evaluate Vista dissemination, participate in a process evaluation of the dissemination of Vista to MultCo., and develop a four-year work plan for improving assessment infrastructure and disseminating Vista to three additional Oregon Counties. The second year goal is to maintain partnerships, continue to develop infrastructure, and use the year one findings to guide roll out of Vista to additional Oregon Counties. DHS has the goal to start with implementation of birth, death and population data statewide through Vista.

The goal for this component of the Vista system evaluation was to identify factors that contribute to and hinder the successful transfer of Vista to other state and county health departments, using Multnomah County, Oregon as a case study.

# Methodology

Three in-person key informant interviews were conducted in the Health Research and Assessment unit of the Office of Planning and Development at MultCo. Diane McBride, Research Analyst II, is a Vista user and does GIS mapping, geocodes data using MapInfo and meets other data needs. Claire Smith is a Research Analyst II, Vista user, and does health assessment and program evaluation. Jon Duckart is a Senior Research Analyst and was hired to prepare the MultCo data for use in Vista. A fourth phone interview was conducted with Sandy Johnson, the Research and Evaluation Supervisor and Manager of the Health Research and Assessment unit. A fifth in-person interview was conducted with Kevin Marshall, a database administrator, and Tracy Gay, decision support supervisor --

both were in the office of information technology at MultCo and due to organizational changes are now part of the county wide information technology support.

Two in-person key informant interviews were conducted at DHS. Steve Modesitt, Information Services Coordinator and Public Health Informatics Section Manager, is the lead coordinator and contact at DHS for the Assessment in Action (AIA) project. The Public Health Informatics Section has decreased to a few people due to budget cuts. Steve coordinated the Oregon work plan, wrote the budget, and helped facilitate a partnership between the state and LHDs in Oregon. Tom Engle, Local Health Liaison, consulted with Steve around the project. Jennifer Woodward, the State Registrar and Manager of the Center for Health Statistics and Joyce Grant-Worley, Statistics Unit Manager, were involved in the project but not interviewed.

Two staff at DOH were also consulted: Kimhoa Ngo, IT Manager for the Center for Health Statistics (CHS), and Frank Westrum, Chief Information Technology Officer for DOH.

Questions were asked related to general vision and process to date for piloting Vista, investment, infrastructure successes and challenges, data and documentation needs, and training (Appendix K). The interviews were taped as an informal discussion guided by the questions.

# Findings

The Vista software and data currently sit on a web server in a locked server room at MultCo. The machine has passwords to access it, resides on the Intranet and is protected by firewall technology. The physical access to the files is secured so that only authorized personnel (like the database administrator) can access, update or manipulate them. MultCo and DHS are currently meeting to discuss whether the server and data should be housed at DHS. Seven people currently have access to Vista at MultCo in the Health Research and Assessment Unit.

MultCo's population based numerator and denominator data comes from several sources. Most of their datasets come from the DHS; however, hospitalization data is purchased from private entities. DHS sends MultCo raw data as SPSS files. Health Information Systems (HIS) at MultCo collects client data that is also available to MultCo staff. MultCo contracts with a local census affiliate (Portland State University, Population Research Center) to obtain intercensal age by sex by race population estimates. The 1990 and 2000 population estimates are Census numbers from the www.census.gov website.
Oregon State data (including MultCo data) are currently installed for county-level birth, death and infant death data for the Health Research and Assessment Center at MultCo.

What follows are the data, software and infrastructure challenges, opportunities and benefits as well as needs and resources invested during the process of adopting Vista.

## DATA CHALLENGES

During the interviews several challenges arose around obtaining data, preparing the data and verifying the data installed in Vista. Below is a descriptive list of what challenges surfaced in the interviews around data.

- ***Obtaining the numerator data***. This was a challenge because it was not always clear to MultCo staff who to contact at DHS to receive the annual datasets for Vista.
- ***Consistent denominator data.*** Several issues arose around the creation of population estimates such as challenges in methodology (e.g. redistributing multiple race, lack of a MARS file for 2001) as well as lack of consistency in who develops the estimates (e.g. some programs create their own estimates). MultCo contracts out to Portland State University for population estimates but it was not yet clear how other Oregon Counties would get needed population estimates.
- ***Getting the numerator and denominator data installed in Vista.*** Preparation of the data was time intensive and required a commitment from a dedicated staff person familiar with databases and programming. This work was critical because Oregon State's datasets had different fields and data elements than Washington States. In order for Vista to access the Oregon data it needed to be put in a form consistent with Washington's data. All of the datasets end up as tables in Microsoft Access. The population tables were especially difficult to construct because the categories of race and ethnicity were difficult to organize. DHS expressed uncertainty around the programming MultCo did and whether it will work for the whole state – DHS may have to do further modifications to the data.
- ***Differences between Washington and Oregon data analysis.*** Examples of differences that arose were in the way race was calculated, field names, field data types, and ICD groupings used (SIDS, alcohol related deaths). In addition, some of the fields that Washington State collects may not be collected by Oregon State. These differences required additional programming changes and/or policy changes in community health assessment practice.
- ***Verification of the data***. An individual respondent identified a concern around ensuring that the data was installed in Vista correctly and that the output was correct. She worked with the raw data a lot and found herself checking the output against her runs. She expressed the need for a formal verification process carried out by people familiar with the data.
- ***Microsoft Access vs. SQL database.*** Technical staff stated that Microsoft Access could become a potential barrier if use of Vista grows and the datasets get larger. SQL would provide a higher capacity for data (can be larger in size) and simultaneous users. SQL would also provide a more secure container for confidential data. While DHS has the capacity to install SQL server few LHDs do.
- ***Data standards.*** It is a significant barrier for states to adopt other state tools when the data aren't collected consistently across the nation. Categorical programs often collect data with no implementation of national standards and national standards change often enough to create challenges in doing community health assessment over time.

## INFRASTRUCTURE CHALLENGES

During the interviews challenges arose around obtaining and maintaining the appropriate hardware to support Vista and the data in a secure environment, documenting the process and providing system-level support for community health assessment. Below is a descriptive list of the infrastructure challenges that surfaced in the interviews.

- ***Establishing a secure server to house the data.*** MultCo and DHS started a discussion around establishing a central place for the data to reside with access for local and state staff. If there isn't a central place established a challenge will be updating the data every year on all of the various servers. While MultCo has prepared the statewide data, the county is not in a position to make Vista technologically available to other counties. At MultCo concerns arose around housing the data at DHS due to the increased potential for bureaucratic slow downs and barriers.
- ***Web server maintenance.*** After MultCo established a server to house Vista they discovered that updating the Vista software engine or dll (this is the brains behind Vista – the programming that does all the calculations) required a complete shut down and restart of the Windows server. The web server is a program on the Windows server – if you shut down the web server program the dll is still tied up with the windows server – it won't release. So, the administrator needed to shut down and restart the Windows server. This is a challenge for MultCo because they put Vista on a server with other applications and multiple administrators. These applications cannot be shut down every time the Vista software engine needs to be updated.
- ***Complete and current documentation.*** MultCo received documentation on preparing the Vista website from PHSKC and requested that this documentation continue to be provided and updated (it is over a year old now). Additionally, complete documentation on updating the software engine (.dll) and a description of the DOH environment that houses Vista would be helpful. DHS staff requested documentation from MultCo on the process of installing the state datasets so that they could determine what had been done and if they needed to make any modifications.
- ***Security permissions on the web server.*** MultCo IT staff experienced a technical error that interfered with the operation of Vista. It had to do with the interaction between the Microsoft web server software, the directories that the web server software used, where the data are stored (Microsoft access jet database engine .mdb files), and how the temporary files were created when data was run. IT staff did research and discovered that they needed to change the permissions on the web server and some of the directories that Vista uses when it runs queries and is using the database engine (Microsoft access jet database engine .mdb files).
- ***Personal Computer (PC) administrative rights***. Every health department or office/program establishes different policies around administrative rights to personal computers. Some have chosen to restrict individuals, other than IT staff with administrative rights, from downloading or installing software a PC. If this was the case, IT staff voiced that it could be difficult to maintain Vista upgrades (even if they are downloaded off the internet) within large organizations with multiple PCs.

- ***Vista support and coordination.*** Interviewees from DHS and MultCo pointed to the need for a dedicated staff person to work on the non-technical issues that come up around Vista. Staff at MultCo have done work around data preparation and taken the initial steps to bring Vista to Oregon. Staff at DHS have been coordinating the AIA activities and planning for implementing Vista statewide. However, one respondent at DHS thought that Vista deserved a central point of contact at Oregon State.
- ***State – Local Partnership.*** DHS staff voiced the need for commitment on both the local and state level to collaborate, facilitate and create a shared vision around making Vista available to other counties. This is especially important in the current environment of diminishing resources and infrastructure. DHS staff felt that MultCo (the largest county population) had a good chance of success due to the resources they have available to them. They also identified 5-7 other LHDs that are more likely to form a core users group.
- ***Public health standards for community health assessment***. DHS staff recognized that unlike Washington State, Oregon doesn't have standards around understanding health issues. The counties went through a public health improvement planning (PHIP) process a couple years ago so they are aware of it but the budget packet didn't get funded so there was no implementation of the PHIP. This presents a challenge for Vista implementation in that DHS doesn't have a clear driving force for using tools to do community health assessment. They need to be more creative and/or rely on LHDs with leadership that already value community health assessment to start using Vista and drive the use.
- ***IT infrastructure.*** States and local health departments have differing hardware, security infrastructures, and platforms so this creates a challenge for adopting other state tools.
- ***Limited resources.*** Oregon is facing large budget cuts and losing staff. A different model than Washington States may have to be adopted. DHS may be able to provide some central support but that will be dependent on the CDC grant funds. Local resources are minimal as well but hopefully over the next few years they will see the utility and be able to support it when the grant is completed.

### SOFTWARE CHALLENGES

During the interviews challenges arose around Vista's front end, training, and current functionality. Below is a descriptive list of the challenges that surfaced in the interviews around the software.

- ***Sub-county analysis functionality***. MultCo staff expressed a need for the ability to use Vista to look at Census Tract and Service Areas.
- ***Vista's user interface.*** MultCo IT staff commented that the Vista front end doesn't use typical Windows conventions (traditional Microsoft keyboard shortcuts, mouse clicks are absent). This could present a challenge for training new users. Also, MultCo staff think the interface is cluttered and may benefit from some professional design input. They mentioned a group called Computer Human Interaction Forum of Oregon (CHIFOO) that deals with integrating human factors, psychology, and

software design – to get a desirable human interface and functional tool without frustrating the user. MultCo IT staff think that Vista is ripe for an overhaul – preserving the core statistical functionality and utilizing some of the new web-based application design tools such as visual studio.net.

- ***Training.*** DHS would like to get a core group of people trained both locally and at the state. MultCo has seven staff with data analysis experience that learned Vista informally by running through it with the central data preparation person. One respondent commented that it was intuitive and that she could get what she needed on her own after only two previous runs. Respondents said that if additional users get access to Vista they will need a more formal training. Depending on who the users are and what experience they have working with data will determine the level of training needed.

## OPPORTUNITIES AND BENEFITS

In addition to challenges the interviews surfaced many opportunities and benefits to adopting Vista in Oregon.

- ***Vista is intuitive***. After only 2 previous sessions, a person with data analysis experience was able to run what she needed.
- ***Ease of use for accessing local information for writing grants.***
- ***Vista makes accessing data much faster***
- ***Vista is a good tool for making geographic comparisons***. Counties can easily compare to Oregon State or other counties using Vista.
- ***Capacity to complete community assessments statewide more easily***.
- Potential for ***state datasets to be readily available to all local health departments*** through Vista. Local health sees the relevance of Vista because historical capacity to analyze data has been at the state and LHDs have not received the information back in the form they can use locally. Vista will give them the opportunity to get information back from the state in a form that is accessible and usable at the local level.
- ***Partnership between local and state health departments.*** Through the interviews I could see the opportunity for the state and local health departments to partner around meeting public health information needs. Both MultCo and DHS have been open to working together and committed to finding solutions together. This partnership could contribute potentially to a stronger public health system.
- ***Vista is good for analyzing basic ICD groupings.*** If a data analyst wants to create their own ICD groupings, they still need to use SPSS.
- ***PHSKC is very responsive.*** PHSKC has come up with solutions to several challenges MultCo has faced like creating a more flexible data import system. They have provided a great deal of mentoring and support around installing the data.
- ***Vista could make publishing periodic reports on certain topics easier.***
- ***Initial installation steps of Vista to the web server were straightforward***. The back end to Vista is simple to install on the server.
- ***Vista is not a high security risk.*** Data is de-identified in Vista so it presents minimal security risk. Small number issues present some risk to confidentiality.

- ***Vista could help facilitate data standards***. MultCo IT staff pointed out that if Vista uses national data standards (e.g. ANSI and ISO) and expands nationally then it will help implement data standards.
- ***DHS has been looking for a query system***. DHS staff are familiar with other products such as MICA. They evaluated MICA and determined that it was not the right system for Oregon but they have an active interest and have been looking for a way to make the states data more accessible.

## DATA NEEDS

- Morbidity data
- State level high quality geocoded data with exceptions manually geocoded (need data available down to census tract)
- Need to install communicable disease (receive from the state aggregated and need it at case level), abortion, linked infant death files, cancer morbidity
- Need underlying or multiple causes of death from the state (stopped providing in 1999 but have for 1993-1998)
- Clear contacts for dataset questions at the state
- Need a central place to store data that is accessible to all state and local staff
- Population estimates based on age by sex by race categories for all of the counties in Oregon

## RESOURCES AND INVESTMENTS

Investments that have been made since the project started in 2001:

- $5,000 to purchase the Vista software at MultCo
- Time for a data administrator/programmer (person with a background in programming, data analysis experience and database management – can work with SPSS syntax) to prepare the data for use in Vista (the data administrator at MultCo started in November 2001 and estimated approximately ten hours per week (480 hours per year) had been invested to prepare birth, death, and infant-death data for all counties in Oregon
- Time looking at SPSS code for data providers to verify Vista output is correct
- $2,500-$3,000 for a server to house Vista
- $14,000 per year for age by sex by race population estimates for MultCo purchased from Portland State University population center
- $2,000 for hospitalization data for MultCo from a private organization
- Minimal time for IT staff to setup hardware, install dll, maintain server (already had a web server on the Intranet available, dedicated to the health department, and lightly used)
- Policy, coordinating and meeting time from Sandy at MultCo
- Coordinating, writing and meeting time from four to five individuals at DHS including Joyce Grant-Worly, Tom Engle, Steve Modesitt and Jennifer Woodward

- For year one, $11,500 went to MultCo for a 0.2 FTE to prepare Oregon's datasets, $4,056 went to the Center for Health Statistics for a 0.1 FTE to install Vista and review the files created by MultCo, and $9,869 went to 0.165 FTE for a coordinating role. (Total with indirects is $33,000)

Plans for continuing the project estimate spending $3,800 on computer equipment, $4,480 on infrastructure development and maintenance, $4,480 on training, $469 on travel, $1,000 on office expenses and $8,961 for 0.15 FTE research analyst to continue with programming and preparing data files for use in Vista (Total with indirects is $33,000).

## VISTA IN WASHINGTON STATE

### *Vista Planning and Advisory Groups*

The Vista Planning Group is convened at least bimonthly to develop, maintain and monitor progress on the Vista Partnership work plan. Two staff from PHSKC participate in the planning group: the chief epidemiologist and the lead systems analyst or developer of Vista. PHSKC retains rights to the software and is responsible for continued development and maintenance. They provide technical support to the SVC around installing the DOH data and also provide support around training. The training lead at SRHD also sits on the planning group and provides support around training in Eastern Washington. The staff from DOH include the Statewide Vista Coordinator who coordinates the Vista Partnership (training, installation of the annual datasets, development at PHSKC, etc), the Community Assessment Liaison who provides support around conducting community health assessment and epidemiology, and the manager of Research of the Center for Health Statistics. Both the CAL and manager participate on the Assessment Operations Group (AOG) – a DOH group that works on guidelines for issues important to community health assessment such as guidelines on how to work with small numbers.

The Vista Advisory Group was formed in 1997. This group oversees the Vista partnership between Washington State Department of Health (DOH), Public Health – Seattle and King County (PHSKC), Spokane Regional Health District (SRHD), and other local health jurisdictions (LHJs). The primary function of the Advisory Group is to guide the development and dissemination of the Vista software, and to ensure that the project continues to be closely aligned with the needs of assessment staff in local health jurisdictions across Washington State.

Most of the Advisory Group's work is conducted between meetings in the form of ad hoc working committees (Planning, Classification, Confidentiality, Functionality, GIS), led by the Advisory Group members. In past years, committees have created new mortality and hospitalization classification groupings, advised on new software functionality, and addressed confidentiality concerns.

Membership is a minimum of nine LHJ representatives and seven DOH staff. LHJ representatives are a mix of small and large LHJs and selected for regional representation. DOH representation includes members of the planning group, Assessment Operations Group (AOG) and data suppliers work group.

### *Relationships with Information Technology Staff*

Relationships with IT staff were necessary to establish early on in the process of making Vista available over the Internet. IT staff in DIRM and CHS were critical in providing connectivity to the CHS so that Vista and the data could reside on a secure server accessible to LHJs. Staff in CHS continue to maintain the secure server, connectivity and update the dll. Frank Westrum, Chief Information Technology Officer for DOH, stated that ties with DIRM could be strengthened to provide more infrastructure and support for Vista.

He shared his vision for DOH to have decentralized IT support with centralized coordination through the Department of Information Resource Management (DIRM). For example, data providers could be brought together to identify what data standards should be used and DIRM could assist in coordinating implementation of the data standards agency wide. Other types of standards such as IT standards, connectivity standards, and resource sharing could be coordinated by DIRM.

The Statewide Vista Coordinator was invited to participate on a Public Health Information Technology (PHIT) workgroup for public health planning. Staff from DOH, LHJs and the University of Washington meet quarterly around system wide information technology solutions.

### *Web Server and Security*

DOH has Vista on a small dedicated server that costs around $3,000. The server sits in the vault in a secure environment (Appendix L). The server doesn't have any other applications on it so that it can be shut down to update the dll. We are in the process of upgrading the server ($4,500.00) and setting up a test server ($3,000.00). The IT staff in CHS estimate that about .05 FTE is spent maintaining the Vista system and providing support. This support includes unregistering the dll, shutting down the server and bringing it back up to re-register the new dll. They also do routine maintenance such as checks to the event log to see if everything is working okay and provide support for the biennial Vista survey so that it can be conducted online.

### *Numerator Data*

All of the datasets Vista currently accesses are housed at DOH. They include:

- Abortions (1981- )
- Births (1980 - )
- Hospitalizations (1987 - )
- Communicable Diseases (1980 - )
- Deaths (1980 - )
- Linked Infant Death-Birth (1981 - )
- Sexually Transmitted Diseases (1993 - )
- Tuberculosis (1992 - )

Datasets such as Cancer, Marriage and Divorce that were implemented on the desktop Vista have not yet been implemented in the web version of Vista. The Custom Data Module will replace Case File Input functionality and allow for additional population based datasets to be analyzed using the web version of Vista.

The data providers in Washington are convened at least annually to learn about Vista and keep up on the latest Vista development. Several also participate on the Vista Advisory Group. They are responsible for providing the annual datasets in a consistent format and informing us of changes to the data.

### *Population Data*

Currently, the population data in Vista comes from three sources. The Office of Financial Management (OFM) produces the official county age by sex population estimates (1980-2001). From these estimates the Department of Social and Health Services (DSHS) and DOH formed a partnership to create subcounty age by race by sex population estimates. A workgroup of people interested in population estimates established the methodology, a demographer at DSHS did the work, and DOH put in some of the funding. After the 2000 Census these population estimates need to be updated to account for the 2000 Census population counts and multiple race data. PHSKC, using NCHS back bridging methodology, created county-level age by race by sex population estimates for the state.

Central coordination of population estimates is critical and a champion demographer to take the lead is definitely helpful. Due to funding and leadership changes the partnership between DOH and DSHS to continue creating subcounty age by race by sex population estimates is not fully functional. DOH decided that subcounty population estimates was not a priority and the five largest health departments in the state came together to find a solution. They are in the process of getting cost estimates to redo the intercensal (1991-1999) subcounty age by race by sex population estimates and create postcensal estimates.

A long-term solution to meeting the changes around consistent and reliable population estimates is fundamental. Partnership between all agencies that use population estimates is also important.

### *Updating the Vista databases*

First, contacts were established for each of the datasets. These individuals are available if users of the data have questions about the dataset as well as provide the annual release of data to the Statewide Vista Coordinator. This can be in the form of a database through email, on a CDROM or through access to a shared drive. It is critical that the data fields and format are consistent year to year and that all years of data are made available each year. Changes to the data must be documented and brought to the attention of the SVC.

The method for updating the databases is in the process of changing. The method for updating the Access databases Vista uses was through the VADMIN module for the desktop version of Vista. For Vista, PHSKC has created SPSS programs that automate the creation

of the databases. All years of the annual data set are run through the SPSS program that automatically generates a database with the new year of data added.

Staff from PHSKC and the Statewide Vista Coordinator (SVC) run the data through the SPSS programs and the SVC copies the updated databases to the web server. This new process is currently in place for the birth, death and infant death datasets. To update the other datasets it is still required to use the VADMIN module until SPSS programs are created for those datasets.

The SVC notifies the contact for each dataset when the new dataset has been added and they validate the data by comparing the Vista output to data they have generated using SAS or other data analysis tools. They notify the SVC if errors are found. If the data seem to be correct the SVC sends an email notification out to all users that a new year of data has been added. Errors are worked on jointly by PHSKC and the SVC.

It may be more efficient to have each of the data programs update the database annually as well as validate the data.

### *Vista Users*

Users from six institutions have been authorized by the Washington State data providers to access data through Vista after signing a data sharing agreement with the DOH.

- The 35 LHJs in the State of Washington are included in the official public health system and may access DOH data through Vista after signing a data sharing agreement.
- Local Health Jurisdictions may also sign agreements for their contractors to access Vista for use on LHJ assessment projects. Contractors may not use Vista or the data therein for personal projects, projects for LHJs not signing the agreement, or projects for other institutions.
- Staff of DOH may access DOH data sets using Vista after signing a data sharing agreement with the DOH.
- Faculty from Washington State Universities may access DOH data sets using Vista for use in instructing students in public health coursework. They may not use the data contained within for commercial purposes. Students in each class may not use the data contained in Vista for commercial purposes. Students and faculty may be granted permission by PHSKC to use Vista with DOH data for research done in cooperation with PHSKC.
- Staff of the Yakima Valley Farm Workers Clinic (YVFWC) may access DOH data using Vista for the use of assessing the health of the population they serve in Yakima, especially focused on Hispanic Health issues. YVFWC may not use Vista or the data therein for other projects or projects for other institutions.
- Staff of Tribal Clinics may access DOH data using Vista for the use of assessing the health of the population they serve, especially focused on Tribal Health concerns. Tribal Health Clinics may not use Vista or the data therein for other projects or projects for other institutions.

Other users under consideration have been the Washington State Board of Health, Hospital Administrators, and not-for-profit organizations that partner with LHJs. The previous death data program manager also wanted to see the death data accessible to the public through Vista.

### *Training*

In the mid-1990s training consisted of a three day comprehensive look at basic epidemiology, Vista and the data sets that are accessible through Vista. Currently, largely due to limited funding, the training is specific to the Vista software. Minimal training is conducted on basic epidemiology or the limitations of the data. In the 2001-2003 biennium we conducted a full day training at each of the Annual Joint Health Conferences. The morning session covered basics and the afternoon covered more advanced topics. This training has typically been conducted on the Sunday prior to the Conference. In 2003, attendance was particularly low due to conflicting trainings with around bioterrorism. Spokane Regional Health District came on board in 2001 to provide regional training support to users on the west side of the state. They conducted two basic trainings in eastern Washington. An additional training in western Washington was conducted in Olympia.

In addition to annual training workshops there is a manual and much of the information from the manual is available on the DOH Vista website. Users can also call Alicia Thompson from SRHD or Julie Alessio, the Statewide Vista Coordinator, to get in person or over the phone assistance. For assistance with basic epidemiology they can contact the Community Assessment Liaison, Christie Spice.

# Conclusions

#### SUMMARY OF FACTORS IMPORTANT IN ADOPTING VISTA

1. ***Getting the software is simple for the end user.*** The end user needs an Internet connection to download Vista at www.vistaphw.net. A user may have to have an IT administrator install Vista if they do not have rights to install software on their personal computer. Judging from Washington's experience, internet connections may differ for each county and need to be improved.
2. ***Educate and communicate to build a constituency internally and externally.*** MultCo found the presentations from PHSKC on Vista were useful in demonstrating Vista's capability and once they used Vista with their own data they understood the potential for themselves. DHS staff thought the meeting at the beginning of the grant cycle with DOH and PHSKC was important. A meeting was also set up where local health assessment staff from Washington presented the uses of Vista to Oregon local health administrators. This proved to be very valuable – county to county learning occurred and enthusiasm built around how data can be used to inform decision making and bring in resources at the local level. This also led to a demystification of Vista. People learned what Vista was and how it could help them meet their population based public health information needs. This can also occur by getting people to download the Mariner State demonstration data and meeting with people to talk about the potential.

Additionally, DHS staff found the articles on Vista comparing it to other national systems useful in building internal constituents.

3. ***Partnering between local health departments and the state is key.*** Adopting Vista statewide lends itself to partnership between state and local health departments. Both Oregon and Washington State are aware that people at the local level require data at the state level for informed decision making; however, it has traditionally been a challenge to carry this out in a way that meets local needs. Because Vista started out in larger counties in both states this partnership seems particularly important in facilitating statewide data dissemination that meets local needs. Decisions need to be made around the best model for infrastructure, data and support. A shared vision needs to be agreed upon. Both the state and local health departments need to have a desire to have a system that makes analyzing population based datasets more accessible to a wider audience.
4. ***Establishing relationships with data providers early on.*** In Oregon, data sharing agreements may need to be established and commitments formed to providing data in a consistent format over time is needed (same variables, same names for variables, numeric fields, etc.). It may be useful to form a data provider's workgroup if datasets are coming from different places, programs or agencies. The Birth and Death datasets are usually the easiest and most straight forward – this has been the experience for both Washington and Oregon. Similarly, STD, TB and other communicable disease datasets are more sensitive and take more time to work with program managers around assurances that the data will not be reported inappropriately. The state should also play a role in providing the data at the sub-county level. This requires geocoding the numerator data and setting up a process to geocode exceptions manually (addresses that don't get matched using software need to be matched by hand). This will maximize data consistency and enable community health assessment to be conducted at the community level.
5. ***Establish a dedicated staff person to prepare the data (technical aspects of adopting Vista).*** Jon Duckart at MultCo has acted as the central part-time person preparing the data for the state and MultCo for use in Vista. A central person or contact with programming and data analysis experience is necessary. It may make more sense, however, to house this person at the state where the datasets are housed or have the data providers update the database annually. Wherever the data administrator is housed he is responsible for acquiring the datasets, working on the format of the data, and coordinating the technical aspects of adopting Vista. He works with PHSKC to modify SPSS syntax files to accommodate different field names, data types, and layouts between state datasets. The data administrator works with PHSKC to set up Vista and works with IT staff to set up Vista on a web server. He is responsible for testing new releases of the data and dll on a test server or PC. His primary role is to coordinate the preparation of the numerator and denominator data and ensure the data is correct. It is just a little extra work to do all of the states data rather than doing a single county. Jon estimates he spent 480 hours per year or 10 hours per week to set up 3 state datasets (birth, death, infant death). If this was his full time job, he would have been able to complete the work in a shorter span of time.
6. ***Establish a central person to coordinate policy, training and politics (non-technical aspects of adopting Vista).*** Sandy Johnson played a critical role in bringing assessment to MultCo. She put together the counties first assessment without Vista and wasn't able to incorporate statistics such as age-adjusted rates so she realized the need

for tools to do community health assessment. She brought David Solet to demonstrate Vista, spent over a year working to acquire the dollars to purchase Vista, and had the initial conversations with IT staff about putting Vista on a web server at MultCo. Steve played a critical role at the state, however, he thinks it deserves someone whose role is committed to coordinating the non-technical aspects of adopting Vista – he was committed to many other projects and thinks it deserves more time.

7. ***Establish relationships with IT staff.*** IT staff at the local and state level need to be involved early on; MultCo IT staff had encountered Vista in 1998 and have an interest in integrated community health data systems; they were impressed with Vista functionality and vision and recruited to deploy Vista once it went web-based and was more suited for deployment in Oregon. IT staff play a critical role in making Vista available on a web server and maintaining the dll. It is also important to encourage a flexible IT infrastructure that allows technology to work for people.
8. ***Establish a dedicated secure server for Vista.*** A decision needs to be made around where the data will be housed and who will maintain the server and update the dll. Because the dll requires the shutdown of the web server, it may work best to have Vista on a dedicated server. The data administrator at MultCo would like to have the server housed at MultCo so they have easy access to it – he thinks the advantage would be better maintainability. He thinks he would be able to respond faster to updates than the state or county IT department and avoid bureaucratic limitations. Politically, it may make more sense to house Vista at the state since it is their function to support all the county health departments. Additionally, DHS houses the data so data issues will be more easily resolved. During a budget crisis it may not be favorable to support a statewide function at MultCo.
9. ***Mentoring from PHSKC and DOH.*** It helps a lot to have assistance from and learn from others experience. Hearing the experiences of Washington State LHJs using data locally to drive public health decisions brings the importance of informed decision making to life. Consultation from DOH and PHSKC guided management of the project.
10. ***Documentation is important.*** Document changes and steps taken to adopt Vista. Vista Users and data managers can document how the data is manipulated; keep a list of differences in ICD groupings needed and available. IT staff should document technological issues if they come up. Documentation from PHSKC needs to be current on how to create a Vista website. DHS needs documentation from MultCo on the process of installing Oregon state data.
11. ***Population data is challenging.*** Setting up the population tables (denominators) takes time – race, ethnicity, age, sex, subcounty variables to consider; it may be useful to establish a group to work on consistent population estimate solutions with participation from state and local levels over time. If different programs, agencies and groups are creating different population estimates using different methods it creates inconsistency across the state rates.
12. ***Establish a formal data verification process.*** In order to limit concerns around the data consistency, a formal process needs to be created to run checks and compare Vista to the raw data output. It should be someone who knows the data either at the state or local health department.
13. ***Define who the users are.*** Clarity is needed around who the users will be for establishing appropriate data sharing agreements and assurances with data providers. If Vista use is to be maximized you will need people with some data experience to analyze

and interpret the data across the state. There are differences of opinion around making Vista available to additional users. One person thought Vista should stay in the Health Research and Assessment Unit, since they do ninety percent of the data requests for other programs. Some felt Vista access should be limited to people aware of the data and data limitations, possibly MPH program managers. Some felt that as more datasets and trainings are available more people will want to use Vista. For example, once the communicable disease data is available the communicable disease epidemiologist may want to use Vista.

14. ***Identify Resources.*** Need to have dedicated staff and time to take on adopting Vista as part of their job and strengthen infrastructure for making informed decisions.
15. ***Leadership Values.*** Leadership at MultCo places a high value on community health assessment. Informed decisions are valued as critical, even more so in the face of budget cuts.
16. ***Training.*** Hands-on experience with real data requests is great for training, one-on-one works well for people who are familiar with data and data analysis. For others a formal training that included Vista functionality, assessment, how to work with rates, and the limitations of the data would be needed. It is important for users to take time early on to get familiar with Vista.
17. ***Security.*** It would have been advantageous to have been provided diagrams of security, a description of how the data is protected at DOH, and what the levels of security are.

# Recommendations

### WASHINGTON

1. Strengthen ties with DIRM to provide additional IT infrastructure and coordination around data standards and resource sharing
2. Continue to have Vista partnership participation on the PHIT
3. Work with WEDSS staff to jointly improve the connectivity to LHJs
4. Work on online Vista training (applicable to other states)
5. Work to add subcounty data and functionality to Vista. This recommendation comes from MultCo staff.
6. Work to have each data provider update as well as validate their annual data set
7. Consider partnering with DHS and MultCo around population estimates
8. DOH and PHSKC partner around creating another front end to Vista utilizing the dll engine (.NET)
9. Formalize the Vista Advisory Group to improve communication
10. Consider migrating Vista databases to SQL, purchasing and planning to maintain a SQL server housing Vista. This is a recommendation from IT staff.
11. Create flexible IT infrastructures that meet the needs of people around technology (technology isn't the driving force – peoples needs are). This is a recommendation I am making based on the information gathered around infrastructure challenges.
12. Create an automated update for the software engine (dll) so that a complete shutdown and restart of the web server is not required. This is a recommendation from MultCo IT staff.

13. Do a human factor assessment on Vista and seek professional design input. This is a recommendation from MultCo IT staff.
14. Continue mentoring and consulting with Oregon
15. Continue to provide updated documentation to Oregon

## OREGON

1. Consider partnering with other states and counties around population estimates and creating a reliable process for updating the population estimates statewide annually.
2. Implement access to birth and death data statewide using Vista
3. Create a dedicated staff position at DHS to prepare datasets for community health assessment and work on the technical aspects of adopting Vista statewide.
4. Create a dedicated staff position at DHS to work on the policy aspects of adopting Vista statewide and improving community health assessment practice.
5. Formalize a clear and consistent process and commitment – politically and technologically - for updating the Vista databases annually and verifying the data
6. Create flexible IT infrastructures that meet the needs of people around technology (technology isn't the driving force – peoples needs are). This is a recommendation I am making based on the information gathered especially around infrastructure challenges and the success at DOH given our flexible IT infrastructure.
7. Consider housing Vista on a dedicated secure server (without other applications housed on it).
8. Consider collecting information on network and Internet connections statewide (e.g. whether they have a T-1 line), and work collaboratively to improve these connections.
9. Identify the Vista Users for Oregon
10. MultCo provide documentation to DHS on process to date

# Appendices

## Appendix A: Partnership Interviews Evaluation Plan

**Timeline and Communication Plan**

- Identify interviewees and develop interview questions with AIA Steering Committee (by March 4)
- Obtain feedback from the Vista Advisory Group and AIA Steering Committee on final drafted evaluation plan by email (by March 7)
- Notify interviewees that Smith-McCann will be contacting them for an interview as part of the AIA initiative (by email on March 10)
- Smith-McCann schedules and conducts interviews, summarizes (by April 18), assesses and makes recommendations (by May 8)
- AIA Steering, AIA Advisory, Vista Planning and Advisory provide feedback on draft summaries and recommendations (by May 30)
- Summary and recommendations finalized (by June 10)
- Clegg and Associates transcribes and does analysis (tapes to them by June 3rd)

**Interviewees**

1. Jim Allen
2. David Solet
3. Julie Alessio
4. Alicia Thompson
5. Joan Brewster
6. Christie Spice
7. Jac Davies
8. Teresa Jennings
9. Ann Lima
10. Mary Ann O'Garro
11. Mark Serafin
12. Jeanie Knight
13. John Whitbeck

**The Vista Partnership**

In 1996, the Washington State Department of Health (DOH) and 33 Washington Local Health Jurisdictions (LHJs), entered into a partnership with PHSKC to disseminate Vista statewide and to provide training and assistance to LHJs in its use. The goals of the Vista Partnership are to:

- Enhance access to population-based assessment data for local and state assessment staff to use in planning and priority-setting
- Ensure access to standardized public health assessment data, methods and measures across the state.
- Provide maximum flexibility to the user to define time frames, geographic areas and assessment topics so that the information is relevant to local communities.

The Vista Partnership is funded through Partnership dollars associated with the Local Capacity Development Fund. Partnership funding has supported software development, hardware and software investments at the local level, training in Vista and related topics (e.g., basic epidemiology), and the Statewide Vista Coordinator position, housed at DOH.

Vista is a user-governed partnership: LHJs across Washington participate in determining the directions of Vista development and other partnership activities (e.g., training) through the Vista Advisory Group. The Advisory Group meets twice a year and is comprised of local health Vista users, DOH data suppliers (and users), PHSKC developers, and others. Much of the Advisory Group's work happens between meetings in ad hoc subcommittees (e.g. Functionality, Confidentiality, and Classification), where users and developers collaboratively work through technical and policy issues. Day-to-day decision-making occurs in the Vista Planning Group (PHSKC developers, the CHS Research Manager, the Statewide Vista Coordinator, and the Community Assessment Liaison), and is based on a consensus model.

The close collaboration between PHSKC, other local health jurisdictions, and the DOH on Vista development has ensured that the software continues to meet the needs of both local health assessment staff and DOH data suppliers. The Vista product – as well as the partnership that supports it – is routinely evaluated through a written survey of users. LHJs also provide feedback on Vista development through other established mechanisms (e.g., WA-ASSESS listserv and Regional Assessment Meetings). Vista is the longest standing information technology partnership to grow out of Washington's Public Health Improvement Plan, and represents an innovative, system-wide solution to public health's need for community assessment information.

**Questions**

(~ 1-2 hours per interview, all interviews will be scheduled in-person and coordinated with other parts of the Vista system evaluation such as focus groups; if in-person interviews are not feasible (due to time and budget limitations) then they will be conducted by phone)

Roles and Knowledge

1. What is your current role in the Vista partnership?
   *-Describe your previous roles in the Vista partnership, if any*

2. How long have you been involved with the Vista partnership?

3. To what extent do you feel the goals of the Vista partnership have been met?
   -If you don't feel the partnership's goals have been met, why?

Support for the Vista Partnership

1. Identify one aspect of support for the Vista partnership you would most like to see improved and describe how that aspect of support might be improved.
   *-Financial, research, development, technical, data, user, relationships*

Partnership Relationships

1. How would you describe the relationships between the participating individuals and agencies in the Vista partnership?
   - *What about the balance of power between partners?*
   - *What about communication mechanisms?*
   - *Do the partners share credit for the partnership's accomplishments?*
   - *Are funds allocated equitably and appropriately?*
   - *Is there mutual trust, respect and commitment between all partners?*
2. What is the level of commitment to communication and inclusiveness?

Partnership Functionality

1. From your perspective, what is functioning well (strengths) with the partnership? What isn't working so well (weaknesses)?
   -W*hat is needed to address the weaknesses?*
2. What have you wanted out of your involvement with the Vista partnership?
3. As a result of the Vista partnership, what changes do you see in assessment practice?
   *-What have you gotten out of the Vista partnership?*
4. What is your vision for the Vista partnership in the future?
   *-What is needed to move the partnership toward this vision?*
   *-What are your thoughts on the sustainability of the Vista partnership?*

Other comments

1. Do you have any other thoughts or ideas that you would like to share about the Vista partnership?

**Letter for Interviewees**

Dear _____

Last fall, the Washington State Department of Health (DOH) was awarded a CDC grant to improve the capability of local public health agencies to perform meaningful and effective community health assessments. One of the first steps in achieving this goal is to evaluate the Vista system - the primary tool used for community health assessment in Washington. We will use the results of this evaluation to develop a four-year work plan for improving assessment practice statewide. This will include plans to enhance the Vista software and partnership, and to disseminate Vista to Oregon State. The 5-year project has been named "Assessment in Action" (AIA).

The evaluation of Vista will include four components: (1) evaluation of the Vista Partnership that has supported Vista's development and dissemination; (2) evaluation of Vista user's needs, (3) evaluation of the software functionality, and (4) evaluation of the process of disseminating Vista to Multnomah County, Oregon. **You have been selected by the AIA Steering Committee to be interviewed as part of the evaluation of the Vista Partnership.** The "Vista Partnership" refers to the joint effort of staff at DOH, Public Health - Seattle and King County, Spokane Regional Health District, and other local health jurisdictions to develop the Vista software, package it with assessment data sets, disseminate it for use in community health assessment, and provide training and technical support. Through interviews with people, like yourself, who have participated in the Vista partnership, we hope to learn how well it is functioning and to identify areas for improvement.

Smith-McCann, a local consulting firm with experience evaluating IT systems in public health, has been hired to conduct the Vista evaluation. Susette McCann and Rhonda Chapman (consultants from Smith-McCann) will be contacting you in the upcoming week to schedule an interview (~ 1 hour in length). In the interview, they will ask you a series of questions about your perspectives and experiences with the Vista partnership (the questions are attached below).

Thank you in advance for your time. We think the information you will provide will be extremely valuable in helping us plan for improvements to this long-standing local-state public health partnership. Please feel free to contact any one of the AIA Steering Committee members (listed below) if you have questions.

Sincerely,

**The AIA Steering Committee**

Julie Alessio
Teresa Jennings
Carrie McLachlan
Carolina Padilla
Melanie Payne
David Solet
Christie Spice
Juliet VanEenwyk
Lyndia Vold

## Appendix B: User Needs Focus Groups Evaluation Plan

The goal for this piece of the Vista system evaluation is to identify the needs Vista is fulfilling and gaps where needs of Vista users are not being met. User needs are fundamental to guiding the ongoing enhancements to Vista. In addition to the focus groups we will be carrying out the biennial Vista user survey. The focus groups will provide us with a new mechanism for gathering valuable user feedback.

**Timeline and Communication Plan**

- Identify focus groups and develop questions with AIA Steering Committee (by March 13)
- Obtain feedback from the Vista Advisory Group and AIA Advisory Committee on final drafted evaluation plan by email (week of March 17)
- Identify location and dates, notify focus group members and seek commitment for participating (Smith-McCann) Could this be piggy backed with the May 1st Olympia Vista training or the April 22nd Vista advisory group meeting in SeaTac?
- Smith-McCann schedules and conducts focus groups, summarizes what has been conducted, assesses and makes recommendations (June 10th)
- AIA Steering, AIA Advisory, Vista Planning and Advisory provide feedback on draft summaries and recommendations (by May 30)
- Summary and recommendations finalized (by June 30)

**The Focus Groups**

We will conduct three focus groups to discuss Vista user needs. Members of the focus groups will be people with current logins (usage will still vary – some users with logins use daily and some use sporadically). One group will be on the east side of Washington and two on the west side. Suggested locations are Seattle/Everett, Olympia/Chehalis and Moses Lake. Final location should be determined by convenience for the maximum number of participants. We considered having two eastside focus groups but we did not have an adequate number of people. We considered having a focus group of non-users or a conference call for non-users. When the actual list of people was produced it was doubtful that we would get adequate participation to warrant either. Attached is a list of people available to participate.

**Discussion Issues**

The focus group will be approximately 2 hours in length and Vista will be displayed using a projector for easy access throughout the focus group discussion.

<u>Web-based Vista (VistaPHw)</u>

- What do you like about the web-based Vista? What are the barriers (e.g., technical problems) to the web-based Vista?
    - *Downloading the executable*
    - *Similar interface to desktop version*
    - *Speed of analyses*

- In what ways is Vista meeting your population based data needs? In what ways could Vista better meet your population based data needs?
    - *What do you use Vista for? What do you produce?*

Interface

- Use the projection of Vista to facilitate discussion and send print screens to people to comment and write on before they get to the meeting. (So they can circle parts of the screens that don't make sense or aren't as user friendly as they could be)
- What enhancements would you suggest for the interface?
    - *Links to program data*
    - *Is it user-friendly?*
    - *Help and data note screens useful?*

Assessment Topics

- Hand out a list of the assessment topics to all participants and use the projection of Vista to facilitate discussion.
- What changes to the current assessment topics would you like to see?
    - *Is the topic organized appropriately and understandable?*
    - *Can you suggest improvements, which would help?*
    - *Can you do the kinds of analyses you need?*
    - *Do we have the indicators we need?*
    - *Do you know everything that is available?*
- Are there emerging assessment topics you would like to see in Vista?

Outputs

- In what ways does the current output in excel meet your needs?
    - *Are there ways the current output can be improved?*
- Describe examples of additional output that would help meet your needs.
    - *Focus group participants should be asked to bring examples of existing output if they exist or give as detailed a suggestion as they can for what they would like to see incorporated in Vista (e.g., examples of useful maps, tables, indicators, profiles, etc. both online (provide URL) and manually created)*

Training

- How can we improve training for Vista?
    - *What training do you need?*
        - *Data usage and limitations of datasets*
        - *Vista software, assessment topics*
        - *Excel, GIS*
        - *Statistics, epidemiology*
    - *Suggestions for methods and sites? (e.g., Joint Conference, web, etc.)*

Additional Users

- What potential opportunities and drawbacks do you see to disseminating Vista to other users?
    - *Who?*
    - What would they use Vista for?

## Appendix C: Online Vista Survey


# Vista 2003 Survey

First Name: Last Name:

Job Title: Phone Number:

How long have you been using Vista?

How often (on average) do you use Vista?

Is Vista your primary tool for accessing and analyzing quantitative population-based public health data?

☐ Yes ☐ No

What other tools do you use to access and analyze quantitative population-based public health data?

☐ SPSS ☐ STATA ☐ SAS ☐ EpiInfo

☐ Other, please specify:

In general, what do you use Vista for (please check all that apply)?

☐ Requests for information from outside your agency/organization

☐ Public Health Assessment Reports

☐ Requests for information from within your agency/organization

☐ Developing Public Health Fact Sheets

☐ Grant Applications

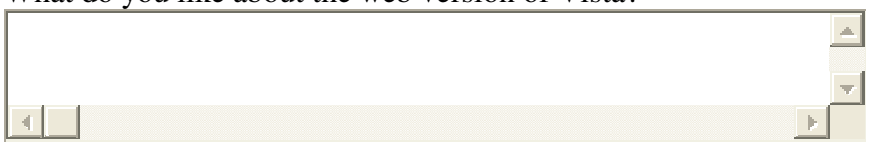
☐ Surveillance

☐ Bioterrorism Preparedness and Planning

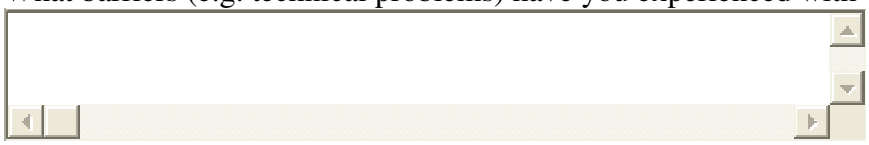
☐ Other (please specify):

Describe the last time you used Vista (what question were you seeking to answer, when it was & please give an example)?

What do you like about the web version of Vista?



What barriers (e.g. technical problems) have you experienced with VistaPHw?



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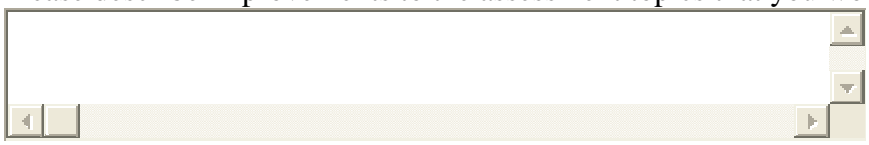
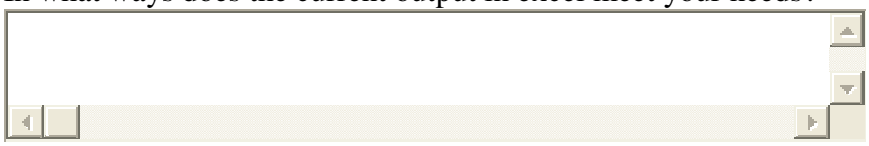
**Vista Assessment Topics and Output**

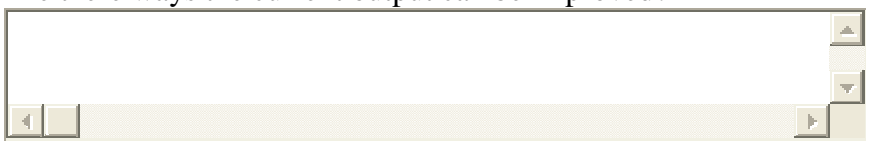
Please describe improvements to the assessment topics that you would like to see:



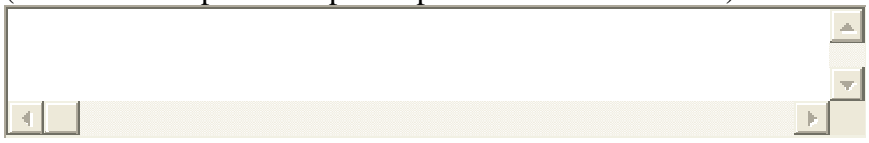
In what ways does the current output in excel meet your needs?



Are there ways the current output can be improved?



Describe in detail examples of additional output that would help meet your needs. (If online examples exist please provide the link or URL)



**Vista Training**

What kind of Vista training have you participated in (check all that apply)?

☐ Vista Training Workshop ☐ Site Visit ☐ Online exercises ☐ Over the phone TA ☐ None

☐ Other, please specify:

If you have not participated in any Vista training, why?

Have you attended more than one Vista training workshop?

☐ yes ☐ no

What is your priority for training in 2003-2005?

What is your preference for ongoing support?

☐ Vista Training Workshops ☐ Site Visits ☐ Online exercises ☐ Over the phone TA

☐ Other, please specify:

Would you be interested in a web-based training module?

☐ yes ☐ no

Is the Joint Conference a good site for you to attend a Vista Training?

☐ yes ☐ no

Additional comments on Vista Training:

**Vista Support**

If you do not subscribe to WA-ASSESS (a listserve for public health assessment) would you like information on subscribing? Yes

Identify and describe one aspect of support for Vista you would most like to see improved:

If you are not currently a member of the Vista Advisory Group would you consider participating in the future?

yes no

What is your vision for Vista in the future?

Additional comments/Other feedback:

Submit Reset Thank you for participating in the 2003 Vista Survey!

## Appendix D: Software Evaluation Plan

**Timeline and Communication Plan**

- Identify criteria with input from PHSKC, DOH, Vista Advisory Group, AIA Steering Committee (by May 12)
- Smith-McCann provides draft report (by June 10)
- AIA Steering, AIA Advisory, Vista Planning and Advisory provide feedback on draft summaries and recommendations (by June 17)
- Summary and recommendations finalized (by June 31)

The following are software attributes that will be used to develop an objective evaluation. We are not comparing Vista to other software. We are applying generally accepted evaluation criteria that are important to all organization mission-critical software. The findings will not be a quantitative score but a discussion of the strengths and weaknesses and recommended enhancements to the Vista software.

Through a participatory evaluation process Vista stakeholders (AIA Steering Committee, Vista Planning Group, Vista Advisory Group, Multnomah County Health Department, and Oregon Department of Human Services) will have input and participation into the evaluation criteria. Parts of the evaluation will need to be done by an information system technical expert (from Smith-McCann) and shared with the stakeholders for comment. I am referring primarily to items 5 & 6 below (Extensibility & Maintainability)

1. Functional Requirements
    a. Current
    b. Planned
    c. Desired

    Evaluate the user community's assessment of how well the system meets their information needs in terms of the current system, planned enhancements and other desired capabilities. In other words, is the system doing what users say that they want? This will be a summary of information collected through other efforts (focus groups, user surveys, work plans, enhancement requests, etc.).

    This will also include a discussion of the statistical capabilities and limitations (complexity of queries, rates, years, race, ICD coding system, multiple variables, age groupings, lowest level of geography capability, data and functionality available by assessment topic) and description of outputs.

    **Deliverable: Description of current, planned and desired functionality according to users.**

2. Ease of use (Usability for current users)
    a. Intuitive
       Describe the ease of use of the navigation and number of screens required.
    b. Installation & Training
       How easy is it to install and train a new user? What are the requirements in time and resources to do this?
    c. User documentation
       What is available online at the website and the help menus? Other documentation?

       **Deliverable: Description of ease of use, installation and training, and user documentation.**

3. Reliability
    a. Uptime
       Evaluate the system's reliability in terms of availability. Measure of the actual versus the scheduled system availability. Will measure total availability (including server, network, and application reliability). Will be informed by users and IT staff. Will include the average time to repair any system failure (server, internet connection, database, etc.).

    b. Robustness
       Document user input on how well the system tolerates problem situations, unexpected conditions, error exceptions, and user errors. Should include any recovery procedures that are usually needed.

    c. Security & Confidentiality
       Discuss information and access security and confidentiality needs of users and how well Vista is performing. Would include discussion of suppression functionality built into system and DOH guidelines. Describe login stream encryption via SSL.

       **Deliverable: Description of uptime, robustness, security, and confidentiality.**

4. Performance
    a. Response times
       This would evaluate how well it meets the user community's needs for response times. May have different requirements for system response times for user input actions versus response times for data analysis and presentation. Does not have to be strictly quantitative. It may just state whether it consistently meets the needs of the users or could be improved. Will also look at display time scenarios (varying numbers of variables and PCs).

       **Deliverable: Description of response times.**

5. Extensibility
    a. Current platform and environment
    b. Platform independence (other than Microsoft)
    c. Adaptability to other environments
    d. Interoperability with other applications (if applicable)

    Description of current platform and environment. Evaluates the adaptability to other environments. This would specifically include the Microsoft ".net" environment. There is a request to include a discussion of a possible fit within the IBM Websphere/DB2 environment. We will research this.

    **Deliverable: Description of current platform and environment, adaptability potential to other environments, and component inventory**

6. Maintainability (Flexibility)
    As mentioned previously, this will be a technical exercise to look at the engineering and architecture of the system. It will determine what industry-standard disciplines are currently followed [construction and further phases of VistaPHw life-cycle (e.g., visual basic, best practices for Microsoft)].

    a. Data & Process models
        Is the database schema documented and available? Are the system processes documented in user-oriented language (e.g. context diagrams and/or use cases)? These would be used to communicate between stakeholders and technical system management staff.

        Are there diagrams depicting the sources and storage of the data? Are there matching textual descriptions of the data collection processes and content? Smith McCann will create data and process models that do not currently exist.

        **Deliverable: High-level data and process models and system context diagram of Vista system.**

    b. System documentation
        Could be in any standard or custom developed format. Other documentation available?

        **Deliverable: Inventory of existing system documentation and further needs for system documentation**

    c. Testability
        Ease of getting out minor and major releases. Is there a system test script (automated or manual) to facilitate release testing? How is it done now?

        **Deliverable: Description of testability**

d. Structural integrity
This would be an analysis of the system's source code to see how well it conforms to industry-standard naming conventions and structures. It would assess how well organized each component of the system is.

**Deliverable: Description (include number of lines of source code, number of variables used, number of attributes that follow naming conventions)**

e. System architecture attributes
Description of architecture (thin-client). What are the requirements for each user (e.g., software or plug-ins)? Object-oriented (or adaptable to it?)

**Deliverable: Description of system architecture (include pros and cons)**

f. Development platform and environment
What development platform is the system based on? What programming language does it use? Which database and operating system and other components of the environment that it needs to operate in? What industry standards are used? Does it conform to DOH standards?

**Deliverable: Description of current platform and environment (include description of industry standards used)**

g. Data source reliability and controls (accuracy & consistency)
What controls are in place to insure integrity of source data? Are there any opportunities to put new ones in place?

**Deliverable: Description of data reliability and controls**

h. Data standards
Does the data conform to DOH[4] or industry-standard structures and naming? Does it use a standard-based structure (e.g. XML, EDI) for data exchange?

**Deliverable: Description of data standards and method for adding data (include data provider perspective)**

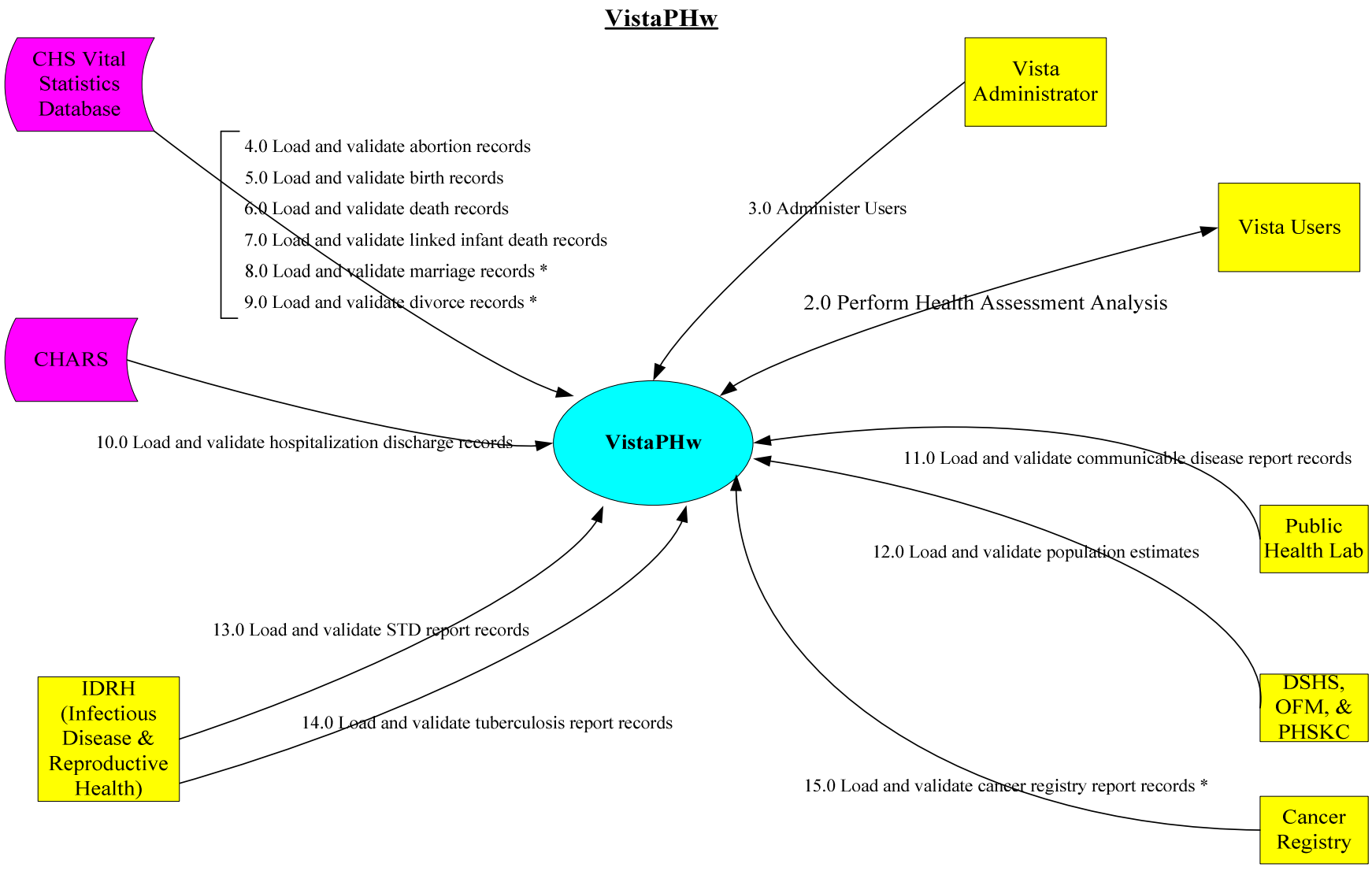
[4] See "www.doh.wa.gov/Data/Guidelines/guidelines.htm"

i. Support requirements
(Current and recommendations) – This would include a description of what support the user needs and what ongoing support is needed from PHSKC and DOH. This description should include current FTE's supporting the system and recommendations for improving support. Also, may include historical startup costs for WA and Multnomah.

**Deliverable: Description of support for Vista system**

**Deliverable: Recommendations for enhancements to Vista**

# Appendix E: Vista Context Diagram and Process Descriptions



# Appendix E: Vista Context Diagram and Process Descriptions

## Vista System Functions

### 1.0 Authenticate Vista User

When the Vista user invokes the Vista application from Windows, the user is presented with a user-ID and password to be authenticated. This is authenticated from the Vista application database. After authentication, the user can perform Vista functions.

### 2.0 Perform Health Assessment Analysis

After a Vista user has been successfully authenticated, this process is used to perform an analysis. The functions selected by the user are normally in the following order:

The user first selects an assessment topic. These currently include:

- Fertility Rates
- Birth Risk Factors
- Abortion/Pregnancy Rates
- Infant Death Rates and Causes
- Birth Risk Factors for Infant Deaths
- Death Rates
- Hospitalization Rates
- Life Expectancy Tables
- Tuberculosis Rates
- STD Rates
- Other Communicable Disease Rates
- Population Estimates

The user then selects the desired geographic units from the menu.

After completing the selection of the geographic units, the user defines the analysis to be performed using the options available for the combination of options selected in the previous steps.

The user can select specific risk factors, counties, age groups, races, and years. At least one item must be chosen from each panel.

When the panel containing the LAUNCH button turns from red to green, the user has selected enough options to perform the analysis. The user can then click the LAUNCH button.

This causes the client's application to generate a script and send it to the server, where it is executed by the Vista Calculator component. The results are then sent back to the client's workstation.

The system places the results of the analysis into an Excel worksheet for further analysis by the user.

After finishing the desired analysis, the user can perform another analysis or close the application.

### 3.0 Administer Users

The Vista administrator receives requests for new users, password changes, and requests to remove old user-ids. These are maintained in a Vista table.

# Appendix E: Vista Context Diagram and Process Descriptions

**4.0 Load and validate abortion report records**

The abortion records are added annually and come from the DOH CHS Vital Statistics database. After a successful load, the totals for all counties are compared and a spot check is done, by age group within county.

**5.0 Load and validate birth records**

The birth records are added annually and come from the DOH CHS Vital Statistics database. After a successful load, the validation procedure involves checking Vista against the CHS totals and some spot checks.

**6.0 Load and validate death records**

The death records are added annually and come from the DOH CHS Vital Statistics database. After a successful load, the validation procedure involves checking Vista against the CHS totals and some spot checks.

**7.0 Load and validate linked infant death/birth records**

The linked infant birth/death records are added annually and come from the DOH CHS Vital Statistics database. After a successful load, the validation procedure involves checking Vista against the CHS totals and some spot checks.

**8.0 Load and validate marriage records**

The marriage records are added annually and come from the DOH CHS Vital Statistics database. After a successful load, the validation procedure involves checking Vista against some hardcopy CHS reports. This dataset is currently not implemented and is planned for use with the "Custom Data Module" feature.

**9.0 Load and validate divorce records**

The divorce records are added annually and come from the DOH CHS Vital Statistics database. After a successful load, the validation procedure involves checking Vista against some hardcopy CHS reports. This dataset is currently not implemented and is planned for use with the "Custom Data Module" feature.

**10.0 Load and validate hospitalization discharge records**

The hospitalization discharge records are added annually after the close of the processing year and come from the CHS CHARS database. After a successful load, the validation procedure involves checking Vista against some hardcopy reports prepared by CHS staff.

**11.0 Load and validate communicable disease report records**

The communicable disease records are added annually and come from the DOH Public Health Lab. After a successful load, the validation procedure involves comparing Vista to the DOH Annual Communicable Disease Report and some spot-checking.

# Appendix E: Vista Context Diagram and Process Descriptions

**12.0 Load and validate population estimates**

The population estimates records are added annually and come from DSHS, OFM, and PHSKC. After a successful load, the validation procedure involves checking Vista against County (Age, Race, and Sex) of new version to old version.

**13.0 Load and validate STD records**

The Sexually Transmitted Disease records are added annually and come from IDRH (Infectious Disease and Reproductive Health). After a successful load, the validation procedure involves comparing Vista to the DOH Annual Communicable Disease Report for each sexually transmitted disease and some spot checking.

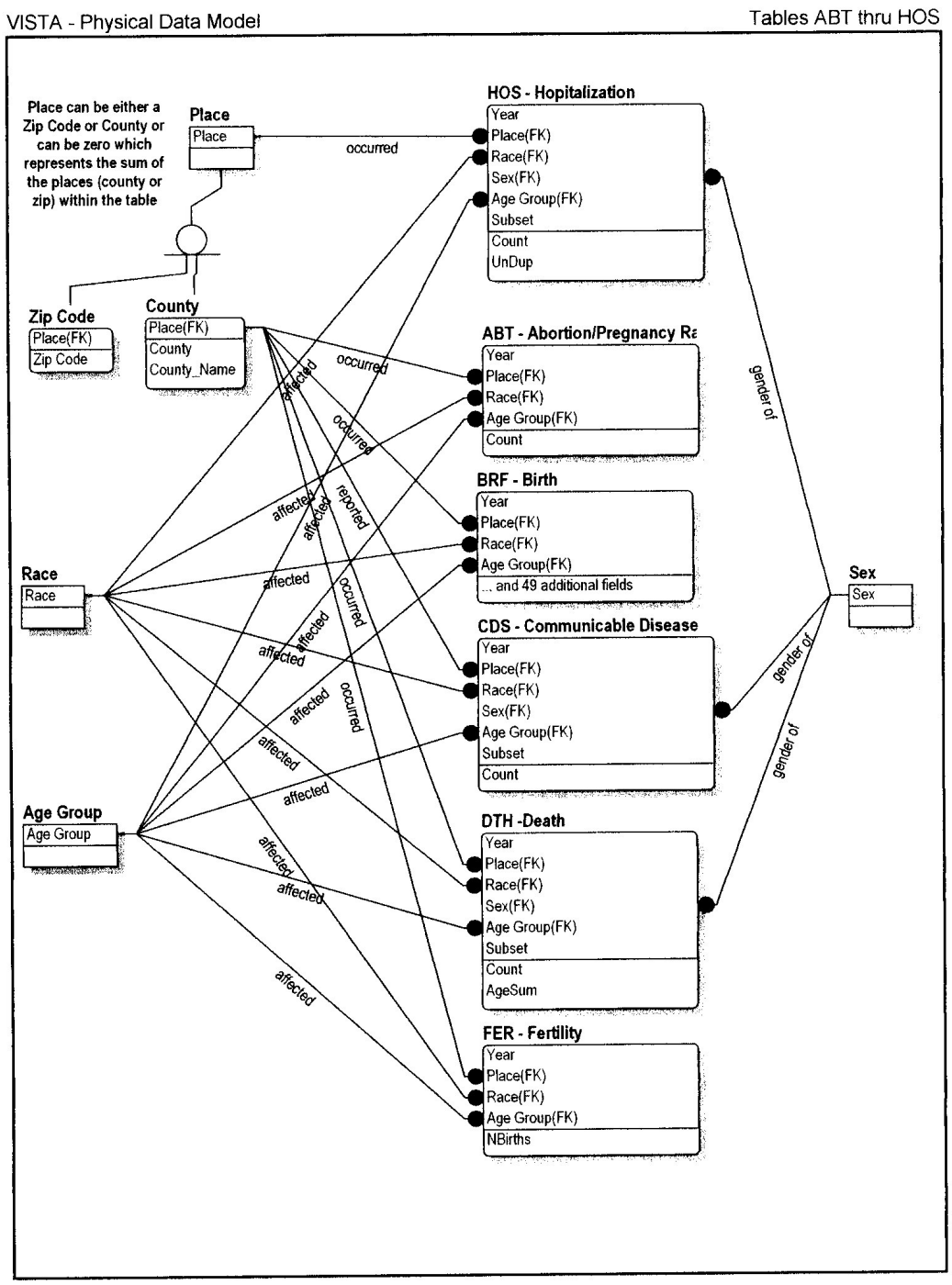
**14.0 Load and validate tuberculosis records**

The Tuberculosis records are added annually and come from IDRH (Infectious Disease and Reproductive Health). After a successful load, the validation procedure involves comparing Vista to the DOH Annual Communicable Disease Report for tuberculosis (checking all counties and state totals.)

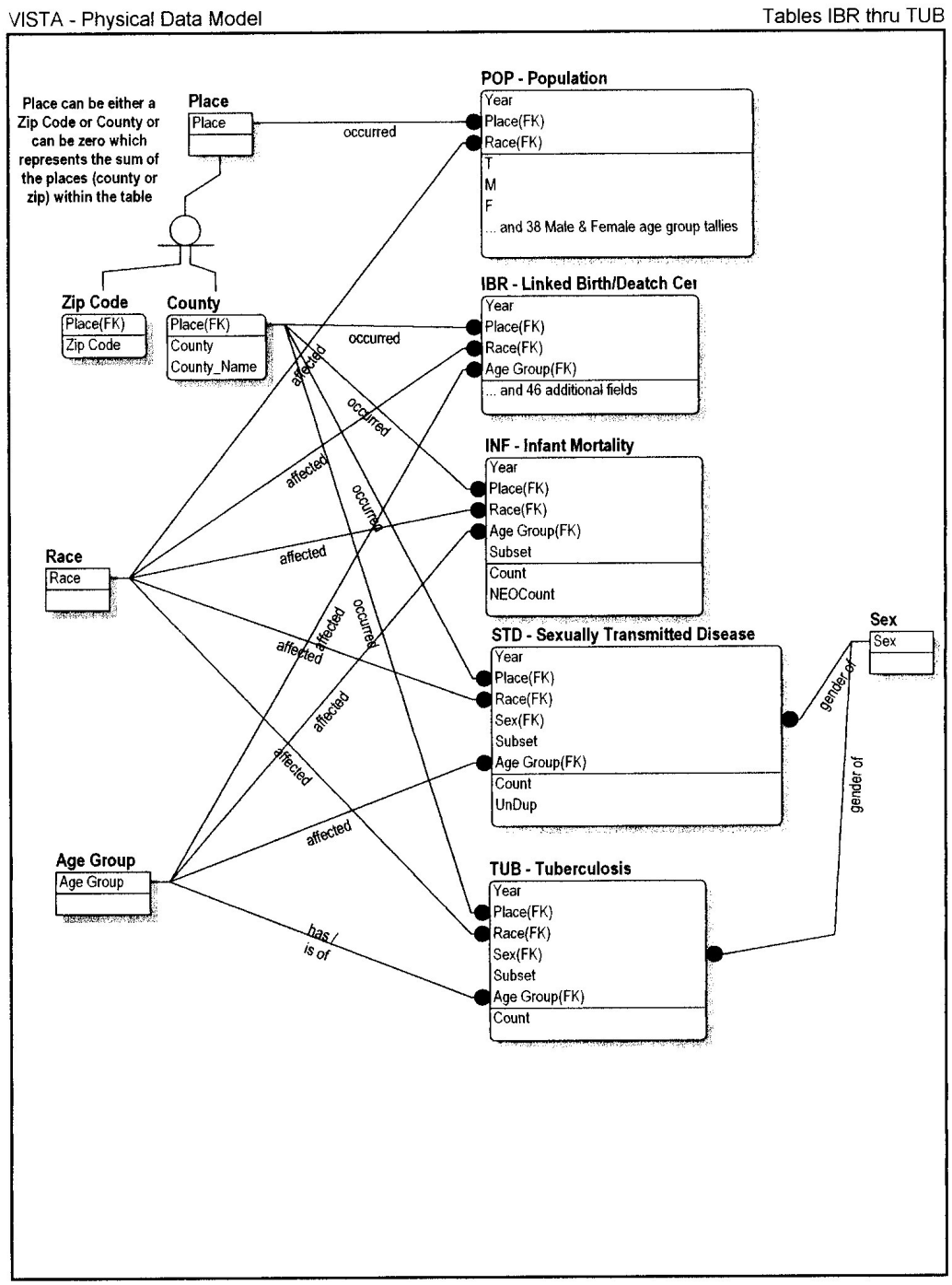
**15.0 Load and validate cancer registry records**

The Cancer Registry records are added annually and come from the Cancer Registry (housed in the Office of Community Wellness and Prevention.) This dataset is currently not implemented and is planned for use with the "Custom Data Module" feature.

# Appendix F: Data Model



# Appendix F: Data Model



## Appendix F: Data Model

| Vista Database | | |
|---|---|---|
| **Table** | **Attribute** | **Definition** |
| **ABT - Abortions/Pregnancy Rates** | | |
| | Year | |
| | Place | (County, 0=Total of all counties) |
| | Race | 0=Total, 1=White, 2=Black, 3=Native American, 4=Asian, 6=Hispanic, 9=other/unknown |
| | Agegrp | e.g. 1014=Ages 10-14; 1517=Ages 15-17; etc. |
| | Weeks | Total weeks of counted pregnancies? |
| | Count | Total Count |
| **BRF - Births** | | |
| | Year | |
| | Place | (County, 0=Total of all counties) |
| | Race | 0=Total, 1=White, 2=Black, 3=Native American, 4=Asian, 6=Hispanic, 9=other/unknown |
| | AgeGrp | e.g. 1014=Ages 10-14; 1517=Ages 15-17; etc. |
| | NBIRTHS | Total count of Births |
| | NLBW | Low Birth Weight — less than 2500 grams |
| | NNBW | Normal Birth Weight — *2500+* grams |
| | NMLBW | Moderately Low Birth Weight— 1500-2499 grams |
| | NVLBW | Very Low Birth Weight—under 1500 grams |
| | SNLBW | Single Births Only, Low Birth Weight |
| | SNNBW | Single Births Only, Normal Birth Weight |
| | SNVLBW | Single Births Only, Very Low Birth Weight |
| | NSCHAGE | School Age — under 18 |
| | NTEEN | Teenager — under 20 |
| | NMULTB | Multiple Birth |
| | NPRTRM1 | Premature Based on Calculated Gestational Age |
| | NPRTRM2 | Premature Based on Estimated Gestational Age |
| | N1ST | Prenatal Care Began in First Trimester |
| | N3RD | Prenatal Care Began in Third Trimester |
| | NKESS1 | Inadequate Prenatal Care Based on Kessner Index |
| | NKESS3 | Adequate Prenatal Care Based on Kessner Index |
| | NKOTEL1 | Inadequate Prenatal Care Based on Kotelchuck Index |
| | NKOTEL34 | Adequate Prenatal Care Based on Kotelchuck Index |
| | NSMOKER | Mother is a Smoker |
| | NDRINKER | Mother is a Drinker |

| | |
|---|---|
| NPOORWGT | Poor Weight Gain During Pregnancy — Under 25 pounds. |
| NANEMIA | Mother has Anemia |
| NSINGLE | Mother is Not Married |
| NINFDTH | Birth Weight can be determined |
| NLBWP | Birth Weight can be determined |
| NNBWP | Birth Weight can be determined |
| NMLBWP | Birth Weight can be determined |
| NVLBWP | Birth Weight can be determined |
| SNLBWP | Birth Weight can be determined — single births only |
| SNMLBWP | Birth Weight can be determined — single births only |
| SNVLBWP | Birth Weight can be determined — single births only |
| NSCHAGEP | Age is known |
| NTEENP | Age is known |
| NMULTBP | Plurality is known |
| NPRTRM1P | Gestational Age can be calculated |
| NPRTRM2P | Estimated Gestational age is known |
| N1STP | Month Prenatal Care Began is known |
| N3RDP | Month Prenatal Care Began is known |
| NKESS1P | Kessner Index can be calculated |
| NKESS3P | Kessner Index can be calculated |
| NKOTEL1P | Koteichuck Index can be calculated |
| NKOTEL34P | Koteichuck Index can be calculated |
| NSMOKERP | Smoking status is known |
| NDRINKERP | Drinking status is known |
| NPOORWGTP | Weight Gain is known |
| NANEMIAP | Anemia status is known |
| NSINGLEP | Marital status is known |
| NINFDTHP | |

**CDS – Communicable Disease**

| | |
|---|---|
| Year | |
| Place | (County, 0=Total of all counties) |
| Race | 0=Total, 1=White, 2=Black, 3=Native American, 4=Asian, 6=Hispanic, 9=other/unknown |
| Sex | 1=Male, 2=Female, 9=Unknown |
| Subset | Amebiasis, Botulism, Brucellosis, etc. |
| AgeGrp | e.g. 1014=Ages 10-14; 1517=Ages 15-17; etc. |
| COUNT | Total Count |

# Appendix F: Data Model

**DTH - Deaths (are some Births linked to deaths through some other table not identified here?)**

| | |
|---|---|
| Year | |
| Place | (County, 0=Total of all counties) |
| Race | 0=Total, 1=White, 2=Black, 3=Native American, 4=Asian, 6=Hispanic, 9=other/unknown |
| Sex | 1=Male, 2=Female, 9=Unknown |
| AgeGrp | e.g. 1014=Ages 10-14; 1517=Ages 15-17; etc. |
| Subset | Infectious/parasitic diseases, Salmonella infections, Shigellosis and amebiasis, etc. |
| COUNT | Count of deaths |
| Agesum | Total of ages of those counted |

**Fer - Fertility**

| | |
|---|---|
| Year | |
| Place | (County, 0=Total of all counties) |
| Race | 0=Total, 1=White, 2=Black, 3=Native American, 4=Asian, 6=Hispanic, 9=other/unknown |
| AgeGrp | e.g. 1014=Ages 10-14; 1517=Ages 15-17; etc. |
| NCOUNT | Total Count |

**Hosp - Hospitalizations (CHARS)**

| | |
|---|---|
| Year | |
| Place | (County or Zip, 0=Total of all county or zip) |
| Race | 0=Total, 1=White, 2=Black, 3=Native American, 4=Asian, 6=Hispanic, 9=other/unknown |
| Sex | 1=Male, 2=Female, 9=Unknown |
| AgeGrp | e.g. 1014=Ages 10-14; 1517=Ages 15-17; etc. |
| Subset | Tuberculosis, Diphtheria, RHEUMATIC FEVER, PNEUMOCCOCAL DISEASE, etc. |
| COUNT | Total count |
| Undup | Based on patient, not on discharge |

**IBR - Linked Infant/Death Certificate**

| | |
|---|---|
| Year | |
| Place | (County, 0=Total of all counties) |
| Race | 0=Total, 1=White, 2=Black, 3=Native American, 4=Asian, 6=Hispanic, 9=other/unknown |
| AgeGrp | e.g. 1014=Ages 10-14; 1517=Ages 15-17; etc. |
| NBIRTHS | Total count of births |
| NLBW | Low Birth Weight — less than 2500 grams |
| NNBW | Normal Birth Weight — *2500+* grams |
| NMLBW | Moderately Low Birth Weight— 1500-2499 grams |
| NVLBW | Very Low Birth Weight—under 1500 grams |

## Appendix F: Data Model

| | |
|---|---|
| SNLBW | Single Births Only, Low Birth Weight |
| SNNBW | Single Births Only, Normal Birth Weight |
| SNMLBW | Single Births Only, Moderately Low Birth Weight grams |
| SNVLBW | Single Births Only, Very Low Birth Weight |
| NSCHAGE | School Age — under 18 |
| NTEEN | Teenager — under 20 |
| NMULTB | Multiple Birth |
| NPRTRM1 | Premature Based on Calculated Gestational Age |
| NPRTRM2 | Premature Based on Estimated Gestational Age |
| N1ST | Prenatal Care Began in First Trimester |
| N3RD | Prenatal Care Began in Third Trimester |
| NKESS1 | Inadequate Prenatal Care Based on Kessner Index |
| NKESS3 | Adequate Prenatal Care Based on Kessner Index |
| NKOTEL1 | Inadequate Prenatal Care Based on Kotelchuck Index |
| NKOTEL34 | Adequate Prenatal Care Based on Kotelchuck Index |
| NSMOKER | Mother is a Smoker |
| NDRINKER | Mother is a Drinker |
| NPOORWGT | Poor Weight Gain During Pregnancy — Under 25 pounds. |
| NANEMIA | Mother has Anemia |
| NSINGLE | Mother is Not Married |
| NMLBWP | Birth Weight can be determined |
| NVLBWP | Birth Weight can be determined |
| SNLBWP | Birth Weight can be determined — single births only |
| SNMLBWP | Birth Weight can be determined — single births only |
| SNVLBWP | Birth Weight can be determined — single births only |
| NSCHAGEP | Age is known |
| NTEENP | Age is known |
| NMULTBP | Plurality is known |
| NPRTRM1P | Gestational Age can be calculated |
| NPRTRM2P | Estimated Gestational age is known |
| N1STP | Month Prenatal Care Began is known |
| N3RDP | Month Prenatal Care Began is known |
| NKESS1P | Kessner Index can be calculated |
| NKESS3P | Kessner Index can be calculated |
| NKOTEL1P | Koteichuck Index can be calculated |
| NKOTEL34P | Kotelchuck Index can be calculated |
| NSMOKERP | Smoking status is known |
| NDRINKERP | Drinking status is known |
| NPOORWGTP | Weight Gain is known |

| | |
|---|---|
| NANEMIAP | Anemia status is known |
| NSINGLEP | Marital status is known |
| **INF - Infant Mortality** | |
| Year | |
| Place | (County, 0=Total of all counties) |
| Race | 0=Total, 1=White, 2=Black, 3=Native American, 4=Asian, 6=Hispanic, 9=other/unknown |
| Subset | Certain infectious and parasitic diseases, Certain intestinal infectious diseases, etc. |
| AgeGrp | e.g. 1014=Ages 10-14; 1517=Ages 15-17; etc. |
| COUNT | Total Count |
| NEOCount | |
| **POP - Population** | |
| Year | |
| Place | (County or Zip, 0=Total of all counties or zips) |
| Race | 0=Total, 1=White, 2=Black, 3=Native American, 4=Asian, 6=Hispanic, 9=other/unknown |
| T | Total count |
| M | Total Mail count |
| F | Total Female count |
| M00 | Total males age 0<1 |
| M01 | Total males age 1<5 |
| M05 | Total males age 5<10 |
| M10 | Total males age 10<15 |
| M15 | Total males age 15<18 |
| M18 | Total males age 18<20 |
| M20 | Total males age 20<25 |
| M25 | Total males age 25<30 |
| M30 | Total males age 30<35 |
| M35 | Total males age 35<40 |
| M40 | Total males age 40<45 |
| M45 | Total males age 45<50 |
| M50 | Total males age 50<55 |
| M55 | Total males age 55<60 |
| M60 | Total males age 60<65 |
| M65 | Total males age 65<70 |
| M70 | Total males age 70<75 |
| M75 | Total males age 75<80 |
| M80 | Total males age 80<85 |

| | |
|---|---|
| M85 | Total males age 85+ |
| F00 | Total females age 0<1 |
| F01 | Total females age 1<5 |
| F05 | Total females age 5<10 |
| F10 | Total females age 10<15 |
| F15 | Total females age 15<18 |
| F18 | Total females age 18<20 |
| F20 | Total females age 20<25 |
| F25 | Total females age 25<30 |
| F30 | Total females age 30<35 |
| F35 | Total females age 35<40 |
| F40 | Total females age 40<45 |
| F45 | Total females age 45<50 |
| F50 | Total females age 50<55 |
| F55 | Total females age 55<60 |
| F60 | Total females age 60<65 |
| F65 | Total females age 65<70 |
| F70 | Total females age 70<75 |
| F75 | Total females age 75<80 |
| F80 | Total females age 80<85 |
| F85 | Total females age 85+ |

**STD - Sexually Transmitted Disease**

| | |
|---|---|
| Year | |
| Place | (County, 0=Total of all counties) |
| Race | 0=Total, 1=White, 2=Black, 3=Native American, 4=Asian, 6=Hispanic, 9=other/unknown |
| Sex | 1=Male, 2=Female, 9=Unknown |
| Subset | Gonorrhea - Asymptomatic; Gonorrhea - Symptomatic; Gonorrhea - PID (F); etc. |
| AgeGrp | Age group at time treated, e.g. 1014=Ages 10-14 |
| COUNT | Total Count |
| UNDUP | Unduplicated, i.e. whether data based on one record per individual or on hospitalizations |

**TUB - Tuberculosis**

| | |
|---|---|
| Year | Year of diagnosis |
| Place | (County of residence when diagnosed, 0=Total of all counties) |
| Race | 0=Total, 1=White, 2=Black, 3=Native American, 4=Asian, 6=Hispanic, 9=other/unknown |
| Sex | 1=Male, 2=Female, 9=Unknown |
| Subset | ? |

| | |
|---|---|
| AgeGrp | Age group age at time disease reported |
| COUNT | Total Count |

# Appendix G: Vista Source Code Notes

VistaPHw Development platform and environment

The development platform the system is based on is Windows 2000, Microsoft Visual Basic 6.0 and Microsoft Access 2000 (with Jet 2000).

Microsoft components/controls used are:

- Microsoft Internet Controls 6.0
- Microsoft Internet Transfer Control 6.0 (SP 4)
- Microsoft Tabbed Dialog Control 6.0 (SP 5)
- Microsoft Windows Common Controls 6.0
- Microsoft FlexGrid Control 6.0 (SP 3)
- Microsoft Common Dialog Control 6.0 (SP 3)
- Microsoft Grid Control 6.0

A custom control, "aagrid", was developed by PHSKC and is used by the user interface application.

The Visual Basic designers used include:

- Data Environment
- Data Report
- DHTML Page
- Microsoft UserConnection
- WebClass

Other tools:

- Installshield Professional 6.3

**Examples of source code issues:**

- **Main.frx**
  Unstated what this code does
  Found comments about **file** naming convention

```
Page: 120
NOTES ON CODING AND FILE NAMING CONVENTIONS
'
'     For each type of analysis indicated in subsequent
'     AddItem statements, input data is found
'     in tables named according to conventions described
'     below.
'
'     Table names have the form
'
'               xxxYYZZgggR or xxxYYZZgggRx
'
'     where xxx is a 3-char code corresponding to
'     the second 3-char code in Analysis(i).tag for the
'     i-th analysis type (see Analysis controls in Main form).
'     YY and ZZ identify the earliest and latest year in the
'     data table, ggg denotes a 3-character place code (e.g., COU
'     for counties and HPA for Health Planning Areas), R is a
'     1-digit identifier of the race scheme, with race codes
'     and labels stored in Race_R.txt.  Finally, the optional x
'     at the end of a table name denotes a secondary table for
'     this data type.  For example, for birth risk factors there
'     are two tables, one to be used when user looks at each
'     risk factor independently, and one to use when two or
'     three factors are to be crossed.
```

Maintainability
Style
Older VB coding style
Explicit variable declarations not provided
Variable naming and instant declaration using older scheme for integers, etc
Straightline code – not structured, top down
Virtually no documentation in code describing what it does
No scoping (global/module) naming convention

- **Ses.FRM**
  Stated using VB 5.0

- **Util.bas**
  Module's variable naming convention described:
  ```
  DefInt I-N  ' default type for all variables in this
        ' form beginning with i thru n is integer.
  ```
  Global functions/subs for app (its purpose is unstated. Performed many changes directly to Main.frm controls)
  Generally small, low complexity in all functions/subs. A few are medium complexity,
  Typically short, cryptic function/sub names
  Manages objects:
  Creates object FSO, VISTACalculator
  Cleanup only when error detected (Exitbutt_click)) which also cleans up objects it did not create.
  Directly modifies values in external objects Main, VistaCalculator, VSBrowset, WebInfo, NoteHDR, BRF, POP, ABT, INF, CUS, LAY, PAR. Some changes manage external objects' behavior (e.g. visibility, enabling/disabling form functionality).
  Most variables are declared, but many undeclared. Some use of older VB supported convention of instant typing declarations (&, $, !, etc.)
  Using functions
  Has small amount of code comments describing purpose of a few functions and lines of code
  Several functions which are active but only contain commented-out code (shelled function with no active statements). Examples: MakeDBF(), MakeDynagroups(), MakeRollup(),
  Non-structured: Some straightline code with embedded goto/gosubs within complex code
  Inappropriate global activity:
  Several functions (e.g. RaceShow() ) explicitly refer back to controls on a presumed-open form (Main) rather than making the form/control a passed reference. (not good for a global. Presumes Main must always be open – nevertheless not a good technique).

  Similarly, the global then directly changes the values – technique unsuitable for a global
  Manages complex interaction between explicitly identified non-global objects (creates) VistaCalculator, VSBrowset, WebInfo. Problematic
  Refers to and changes global variables contained in another global area (VISTA.bas). Global variable names do not reflect scope – hard to trace and manage

- **VISTA.Bas**
  Contains global variables (unstated) and some Win32 function declarations
  200-300 globally accessible and modifiable variables:
  brief names with no naming conventions for scope or type
  largely undescribed purposes
  Undocumented as to who/where values are modified or maintained
  Very atypical number of globals for even the most complex of systems.
  No structs, all individual variables.
  No scope or type naming convention for global variables. Examples of globals:
  apptest is boolean,
  DRV is a string,
  UnzipObject(99) is a bounded string array,

STFsaveLine is an unbounded string array,
STFnsaveline is a Long integer,
STF1_G is a boolean
Rcod is an unbounded double array,
Rpik is an unbounded boolean array

Makes objects globally available:
objExcel As EXCEL.Application
objSPSS As Object
objSQL As Object
objSyntax As Object
vCalc As Object

- **STF.bas (assume companion module for STF.frm)**
  Purpose:

  ' GENERATE SPSS PROGRAM AND UNZIP DATA FILES FOR SELECTED
  ' CENSUS TABLES (STF1 AND STF3 TABLES)

  Several code-level comments in the most complex routines.

  No function/sub –level descriptions/comments

  (Maintainability: indenting makes somewhat hard to follow logic breaks at function/sub level (e.g. sub/end sub))

  Several monolithic complex routines.

  No "on error" checking or explicitly bypassed.

  Can break into smaller for easier maintenance through better scoping and use of functions.

  Traced call to MAKEDBF() to inoperative code (shell that had code commented out)

  …?

- **VDBF.bas**
  No module purpose statement

  A few function/sub purpose descriptions.

  Some line-level comments

  Function/sub names short but probably understandable within context of program.

  Directly sets visibility of "PCTL" form.

  Contains about 30 variables globally available to the application to access and update. All but 4 globals are named with a DBF prefix.

  Describes a naming convention for this module's variables' data types:

  ' default type for all variables in this
  ' form beginning with i thru n is integer.

  Beyond integers, no data type naming convention provided.

# Appendix G: Vista Source Code Notes

- **Make1.bas**
  Purpose: not provided

  Several code-level comments

  Provides local variable naming convention for integers:

  ```
  ' default type for all variables in this
  ' form beginning with i thru n is integer.
  ```

  No further scoping or naming conventions provided

  Very large section of unused code (commented-out)

  Some very large complex routines could benefit from breaking into several smaller for easier maintenance through better scoping and use of functions.

  Depends on PAR and MAIN being available

- **Login.frm**
  Purpose: not specified

  No code-level or function/sub documentation. Usually this is less critical in an event-driven "form" program.

  Same comments re naming conventions re scope and type

  Loads VSBrowser, creates global FSO (FileSystemObject), assumes MAIN is available

  Has hardcoded user name and password in the code. Is this security issue?

  No naming convention used for form controls. A control name is indistinguishable from any other variable and from other types of form controls.

  Some strightline/gosub logic

- **LaunchPanel.frm**
  Purpose: no specified

  Same comments re naming conventions re scope and type

  Some code-level comments, but no function/sub descriptions. Generally less important for a form program, but the many non-form-event routines make the absence more critical

  Sets values in object POP, MAIN,

  Straightline/gosub logic

### General observations on adherence to coding standards.

**Visual Basic's "Option Explicit"** feature is not used. "Option Explicit" is generally considered a coding standard and facilitates maintainability and early detection of programming errors. Vista's legacy of older code, from a time when "Option Explicit" was not available, has proliferated some degree of program maintenance and reliability problems.

Uses the archaic **Def*datatype*** to set default types for variables.
*DefInt I-N ' default type for all variables in this form beginning with i thru n is integer.*

Uses the archaic **datatype suffixes** to declare variables: *Function DBFfldspec(fldname$, typ$, iloc%, iwid%, idec%) As Integer*

# Appendix G: Vista Source Code Notes

Function and subroutine parameters are not declared using **ByRef and ByVal**. This can be an issue when converting the to a different version of Visual Basic and it is recommended that parameters be declared explicitly before converting to VB.Net.

**Visual Basic's built in "on error" error handling** is virtually unused. This feature that enables the programmer to gracefully present an error message and/or provide alternative processing. Often "on error" is explicitly turned off in Vista, which sometimes can be appropriate. When "on error" is used, usually it goes to a non-functional routine that presumes a user wanted to "cancel." A locally-built routine, "Disaster," apparently handles Vista's system errors by presenting a context-appropriate message and then always closing Vista down.

When an error is not a result of programming, but is a system error such as a file or other system resource not being available, the system will display a message. Without "catching" it with the "on error" statement, the system will unceremoniously shut the application down or force the user to shut it down.

There are 40 uses of **computed GoTo** statements.

**VistaCalculator** uses **GoTo** statements to create processing loops. The only accepted uses of GoTo in an application today are for moving immediately to an error routine or an exit point.

# Appendix H: Examination of Vista Global Variables

29 of Vista's approximate 300 global variables were evaluated for appropriateness of global scope. Global variables are used on the occasions when several modules need to use the same piece of information. Since globals are open to all of the system, they should be scrupulously avoided unless required. Our findings are as follows:

- 3 variables are set in one module and used by many -- which is an appropriate use for globals.
- 6 were used only within the module that created it and so were not appropriate as a global. Perhaps these had global use in prior versions of Vista, but they can be removed to their home module to improve maintainability. These variables are highlighted in blue below.
- 11 variables are no longer used by the application. They were once used, but as Vista changed their use was either replaced by other variables or eliminated altogether. In one case, the value of a variable is set, but never used. These can be removed to improve maintainability. These variables are highlighted in red.
- 5 variables are only used by one other module. A better technique would be to pass the variable as a parameter to the second module which 1) would help define the other module and 2) remove the somewhat confusing global. These variables are highlighted in green.
- 3 variables' values are set by multiple modules. This usage can introduce considerable confusion into a system since a programmer will have a difficult time tracing when and where a variable is changed during processing and make a system difficult to test. We would recommend examining this code closely and improve it where possible.
- 1 variable's value is never set, but is used. This is a potential hidden error in Vista.

The following global variables were randomly selected from Vista.bas:

BRFdemogSame: SET: Main (2), GET: BRF

ObjSQL: NOT USED

StrPacketParsed: SET: CUS, GET: CUS

VistaPHwPath: SET: VistaPHwPath, Login GET: VISTAPHwUpdate, UTIL, MAIN, Login, DirTree

NumConnect1:
SET: Make1.bas, BRF.bas, BFR.bas, ABT.bas
GET: Make1.bas, BRF.bas, BFR.bas, ABT.bas

YrEndIndex: SET: Main GET: Make1, Main,

STFindicatorTitle: SET: stfind GET: stfind

STF_comp_calcvars: SET: stfind GET: stf

STF3_C: SET: main GET: main

OK_analysis:
SET: main, util, tub, stf, sst, ses.frm, ses.bas, pop.frm, pop.bas, make1, lex, laynew, irc, inf, ibr, gendz, cus, cas_vu, cas, brf, bfr, agespec, abt
GET: main, make1

S_analysis: SET: Make1 GET: util

DataSources: SET: main GET: main

ThisAnalCode:
SET: main
GET: main, util, tub, pop, par, notehdr, make1, lex, launchpanel, ibr, gendz, cus, cas_vu, brf, abt

Usrrun not used

YYmin SET: Main GET: main

Aggcmd SET: stf.bas, ses.bas GET: not used

ThisConn: not used

# Appendix H: Examination of Vista Global Variables

ThisPartnfile: SET: none GET: par

ThisPLtypeCode: SET: main GET: main, util, stf.frm, stf.bas, pop.frm, par.frm

PLndecimals: not used

NuserFields: SET: launchpanel GET: launchpanel

YearCnvrt: not used

NsubsetsTUB: SET: tub GET: tub, make1

Agecomblo2: not used

OutFrst: not used

Nmalesave: SET: util GET: util

DcombFrst: not used

SESarchive: not used

SESVARSD: not used

# Appendix I: Vista On-Line Update Log

VistaPHw 3.2 05/08/03

1. Release notification now reminds users to perform a download instead of a quick Update when appropriate. Major releases have one decimal point in the version, such as 3.2, and coincide with a new version with the same number of the calculator program that runs on web servers.
2. The new calculator version 3.2 fixes two bugs that were introduced when the program was modified to handle infant mortality rate computations. One bug resulted in zero rates for sex-specific selections when Total over race was not also specified. The other bug failed to apply comparison ratios to death calculations for grouped years when all years in the group were less than 1999.

VistaPHw 3.1.3 05/06/03

1. Fixed problem that put VistaPHw in infinite wait state when running on a PC that is not connected to internet.

VistaPHw 3.1.2 05/06/03

1. Output fields AveCNT and AvePOP now contain values; previously they were blank.
2. When selecting conditional birth risk factors, the red/green bar remains red if no conditional factor is selected.
3. Selection procedure for dynamic grouping has been changed from Microsoft selection procedures to VistaPHw selection procedures. The Microsoft procedure uses only the left button, and toggles on and off with each click. It also requires the shift key to select a consecutive range of items, and the control key to select multiple non-consecutive items. The VistaPHw procedure uses the left button to select items and the right button to clear items, and allows consecutive ranges to be selected simply by dragging the mouse cursor. No keys are associated with the VistaPHw procedure.

VistaPHw 3.1.1 04/22/03

1. When only one type of rate is displayed, such as crude rate or age-specific rate, a short description of the rate is included in the heading part of the output. E.g.."RATE = Deaths per 100,000 in age range 65 plus (age-specific rate)." When several types of rates are displayed (e.g., both crude and age-specific), then the types of rates are identified by a short label in the STAT field, as before.

VistaPHw 3.1 04/20/03

1. The following bug in "Other Communicable Diseases" ASSESSMENT TOPIC has been fixed: Incorrect counts were computed for user groupings of diseases.
2. Minor changes and corrections to the new infant deaths modules.

VistaPHw 3.0+ 4/16/03

1. Add two new modules: Infant Mortality Rates and Risk Factors for Infant Mortality.
2. Ability to control access to data collections stored on 10cai/LAN drives.
3. Miscellaneous improvements and corrections. All know errors have been corrected.

VistaPHw 2.3.4.1 1/22/03

1. Use new menu files.
2. Fix bug that missed putting data source in output.

VistaPHw 2.3.4 1/5/03

1. Version 2.3.3, changed citation.txt to DataSouces.txt, with new syntax. Also, do not check for password for data collections stored on local or LAN drive.
2. Version 2.3.4 permit installation in different path to VistaPHw folder than c:\ProgramFiles. (First install in c:\Program Files\VistaPHw, then move VistaPHw folder; for those who do not have rights to change files under c:\Program Files). Also, use local version of calculator, VistaCalcLocal.DLL, when data collection is on a local or LAN drive. VistaCalcLocal.DLL will be installed during the initial installation of VistaPHw.

VistaPHw 2.3.2 5/9102

1. The system file Vistascript.txt is now installed and updated along with VistaPHw, instead of being stored in and downloaded from data folders.

VistaPHw 2.3.1 4/17/02

1. Forced excel output to have the same number of decimal places for each cell in any column.

VistaPHw 2.3 4/9/02

1. Label "Partial Pregnancy Rate" changed to "Pregnancy Rate (births + abortions)".
2. Added option to get both age-specific and "All Ages" pregnancy and abortion rates in the same run.

# Appendix I: Vista On-Line Update Log

VistaPHw 2.2.8 3/29/02

1. Bug fix: The Data Notes button was disconnected for births, abortions, and TB.

VistaPHw 2.2.7 3/29/02

1. The "Pregnancy Rate" option in the Abortion module has been renamed "Partial Pregnancy Rate" because it omits the fetal loss component.
2. The Help text in the Abortion module contains a brief about differences among VistaPHw, Washington State, and NCHS pregnancy rates.

VistaPHw 2.2.6 3/20/02

1. Bug fix: after installing a place grouping file, run-time error occurred when selecting places.

VistaPHw 2.2.5 3/19/02

1 Bug fix: data rights checking did not permit access to population tables.

VistaPHw 2.2.3 3/14/02

1. Require that data access rights be stated in the Users table, except for USA data collection (for which data are not yet available on the website).

VistaPHw 2.2.2 3/14/02

1. Bug Fix: run-time error when selecting topic if only one data collection in website.

VistaPHw2.2.1 3/13/02

1. Added ability to limit user-specific analyses to state totals only.

VistaPHw 2.2 3/13/02

1. Added ability to control data access and data suppression with entries in the user database on the web server.
2. Bug fix: the old place grouping mechanism failed because of options introduced in 2.1.2.
3. Added Help and Exit button.

VistaPHw 2.1.3 3/6/02

1. Bug fix: sometimes after changing assessment topics VistaPHw would run the previous script instead of creating a new script.
2. Bug fix: when changing assessment topics, VistaPHw would always require re-selecting the geography, even when it was the same.

VistaPHw 2.1.2 3/5/02

1. Added convenient grouping function for places, races, and subsets.
2. Miscellaneous minor corrections and cosmetic changes.

VistaPHw2.1.1 2/20/02

1. Fixed problem where login screen did not show Cancel & OK buttons when only the demo site was listed in Datalinks.txt.

VistaPHw 2.1 2/7/02

1. Added interface for computing abortion rates.
2. Permit user to change data website at any time.
3. Permit multiple copies of grid output, including streams.

VistaPHw 2.0.8.6 12/31//01

1. Correct bug that displayed all items of multiple menus in the first menu.

VistaPHw 2.0.8.5 12/25/01

1. Corrected bug that reversed rates for adequate and inadequate Kotelchuck birth risk factors.

VistaPHw 2.0.8.4 12/24/01

1. Compute Plot1, Plot2, and Plot3 when requested.
2. Prevent "double-clutching" of login screen.
3. Display WAIT message while login screen waiting for web response.

VistaPHw 2.0.8.3 12/17/01

1. Eliminate checking for path to windows executable, notepad, and WordPad.

# Appendix I: Vista On-Line Update Log

VistaPHw 2.0.8.2 12/17/01
1. Permit user to go to STREAMS without first selecting an assessment topic.

VistaPHw 2.0.8.1 12/17/01
1. Display message on how to fix problem when Epilnfo clobbers scrrun.dll.

VistaPHw 2.0.8 12/13/01
1. Enable user to change the data website any time in session.
2. Add help information for STREAMS and LAUNCH.

VistaPHw 2.0.7 12/10/01
1. Enable data tables to be stored in multiple distributed databases.

VistaPHw 2.0.6.2 11/28/01
1. Replace runtime error with message when no denominator table available to match a numerator table.
2. Add help text for Comparability Ratios.

VistaPHw 2.0.6.1 10/19/01
1. Fix bug which caused sort fields to occasionally be dropped.
2. Corrected def of Pulmonary and Extra-Pulomonary TB cases. Neither category includes cases that are both Pulmonary and Extra-Pulmonary.

VistaPHw 2.0.6 10/19/01
1. Fix Birth Risk Factor problem - use correct table, conditional.

VistaPHw 2.0.5 10/4/01
1. Finish Birth Risk module, including Conditional option 2. Miscellaneous fixing and fussing.

VistaPHw 2.0.2 10/3/01
1. Always download Inventory.txt to avoid situations in which assessment topics could be enabled/disabled incorrectly.
2. Start Excel output with 1st sheet.

VistaPHw 2.0 10/1/01
1. Fix glitch in login protocol.

VistaPHw 2.0 10/1/01
1. Added Fertility Rates and Birth Risk Factors
2. New feature: Conditional Birth Risk Factors
3. Added Grid Output feature to circumvent Excel problems.
4. Improved formatting of output so all values in a column have the same number of decimal places.
5. Changed data table naming conventions to provide for increased capacity when including user tables.

VistaPHw 1.8.10 9/9/01
1. Cosmetic changes
2. Show default userid in login screen, except if Visitor site.
3. Earlier checking of consistency for selected years vs. combination
4. Enforce limit of 120 rates for demo analyses.
5. Warn user when > 1200 rates in production analyses.
6. Make timing information standard, include row counter while preparing output.

VistaPHw 1.8.9 9/6/01
Version change to test quick update function in 1.8.8

VistaPHw 1.8.8 9/5/01
1. Included Sex as a sort variable. [KEY]
2. Added error trapping to Excel connections, switch to Vista grid when errors encountered. [KEY]
3. Added quick update feature in log in screen which enables users to install new version of VistaPHw simply by downloading the new VistaPHw.exe. [KEY]

VistaPHw 1.8.7 9/4/01
1. Fix glitch in new features in 1.8.6.

# Appendix I: Vista On-Line Update Log

VistaPHw 1.8.6 9/4/01

1. Checks user's version against latest version in this document. Will display contents of this doc when user clicks "Details". [KEY]

VistaPHw 1.8.5 9/4/01

1. The race panel was widened to show more descriptive race labels.
2. Display correct User ID instead of jim.allen@metrokc.gov.
3. Provides output grid when it cannot connect to Excel. [KEY]

VistaPHw 1.8. 9/2/01

Cosmetic Changes

VistaPHw 1.8.3 8/30/01

1. Fixes run-time errors when grouping geography.
2. Incorporates tutorial for first-time users. [KEY]

# Appendix J: VistaPHw Data Components

**Data Sources** (from DataSources.txt, 06/28/03)
[hos] Hospitalization Discharge Data: Washington State Department of Health, Office of Hospital and Patient Data Systems.
[fer] Birth Certificate Data: Washington State Department of Health, Center for Health Statistics.
[brf] Birth Certificate Data: Washington State Department of Health, Center for Health Statistics.
[dth] Death Certificate Data: Washington State Department of Health, Center for Health Statistics.
[inf] Linked Birth/Death Certificate Data: Washington State Department of Health, Center for Health Statistics.
[ibr] Linked Birth/Death Certificate Data: Washington State Department of Health, Center for Health Statistics.
[abt] Abortion Report Records: Washington State Department of Health, Center for Health Statistics.
[std] STD Report Records: Washington State Department of Health, STD/TB Services.
[tub] Tuberculosis Report Records: Washington State Department of Health, STD/TB Services.
[cds] Communicable Disease Report Records: Washington State Department of Health, Communicable Disease Epidemiology
[pop] 1990-2000 Population Estimates: EPE Unit, Public Health - Seattle & King County, February, 2002
Estimates are controlled to NCHS Bridged Race Estimates of the population as of 4/1/2000 (see ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/datasets/nvss/bridgepop/b40100.txt)and, for intercensal years, controlled to WA OFM Estimates created in 11/2002 (see http://www.ofm.wa.gov/pop/coagemf/index.htm)

1980-1989 Population Estimates are unofficial, based on estimates by the Washington State Office of Financial Management.

ZIP code and race estimates were created before the 2000 Census data release and are known to contain inaccuracies. Use them with extreme caution.

## Appendix J: VistaPHw Data Components

### Glossary of Information Technology Terms

Application Interface describes the elements of data needed to communicate between two software programs or components

Dedicated Server Platform indicates a computer is used for a single purpose or software application and its customers only.

Dual Process Server provides for two computer CPUs (Central Processing Unit) in one server. For example, you could install two Intel Pentium III 1.3GHz processors in one such platform.

Distributed Client Server Model describes software that is designed to perform cooperatively on multiple computers where each user's computer communicates with one or more other computers.

DLL is an abbreviation for Dynamic Link Library, which is a Microsoft mechanism for storing computer code.

Encryption is a process that scrambles and descrambles data for the purpose of securing information from unauthorized users.

Fat Client Architecture is a design where most of the processing happens on the user's computer or where programs are deployed to the user's computer in order for the system to function. The data itself is stored on the server.

Global Variables see scoping. This is a class of variables within a computer application that are available to the widest variety its component modules (see Modules).
Module (form, class, supporting) is a subdivision of a computer application's overall program code. One or more modules form an "application."

Procedures when used in the context of a computer program, are also known as subroutines and functions and are subdivisions of a module.

Scoping is the characteristic assigned to an application's procedures and variables that express which pieces of the application can use it. Its purpose is to discretely hide unnecessary details from an application's many component parts.

Structural Coherence is the degree to which the various parts and pieces of software that comprise Vista are reasonably organized into functionally related groups with clear purpose and responsibility. A programmer can more readily and inexpensively learn, change and test a coherent system. The importance of structural coherence increases as programmer turnover rate increases.

System Structure expresses the way in which a system's various programs, modules, procedures, etc. are organized to provide services to its' users.

## Appendix J: VistaPHw Data Components

Testability as used in this report refers to the capability to effectively and efficiently determine that the software accurately provides the services and information required by its users.

Test Environment Platform is a computer that contains a copy of databases and computer programs dedicated to testing the accuracy and performance of an application.

Thin Client Architecture describes software that is like the Distributed Client Server Model but that uses a limited-ability program on the user's computer to perform the application's processes. The limited-ability program in this case is a web browser such as Microsoft's Internet Explorer.

Undeclared Variables is a feature of older versions of the Visual Basic language that simplifies programming

## Appendix K: Multnomah County Case Study Evaluation Plan

The goal for this piece of the Vista system evaluation is to identify factors that contribute to (and hinder) the successful dissemination of Vista in other state and county health departments (using Multnomah County, Oregon as a case study).

**Timeline and Communication Plan**

- Identify key informant interviewees and develop questions with AIA Steering Committee members and Oregon staff (by June 10th)
- Obtain feedback from the Vista Advisory Group on final drafted evaluation plan by email (by June 10th)
- Conduct interviews with staff from Oregon (by June 18th)
- Write draft summary (by June 23rd)
- AIA Steering, AIA Advisory, Vista Planning and Advisory provide feedback on draft summaries and recommendations (by June 30th)
- Summary and recommendations finalized (by July 10th)

**The Interviews**

Multnomah County – June 11th

1. Kevin Marshall (database administrator) and Tracy Gay (supervisor) (3pm, to discuss set up of web server and other back-end things)
2. Jonathon Duckhart (senior research analyst) (4pm, discussing preparation of data and, if desired, end-user issues)
3. Diane McBride (1pm, discussing end-user issues)
4. Claire Smith (2pm, discussing end-user issues)
5. Sandy Johnson (phone)

Oregon Health Services – June 12th (8am – 11am)

1. Steve Modesitt (CIC Information Coordinator)
2. Tom Engle (Local Health Liaison)
3. IT staff

Washington State Department of Health

1. Kim Ngo (IT manager, CHS)
2. Frank Westrum (Chief Information Technology Officer)

Public Health – Seattle and King County

1. David Solet (Assistant Chief – EPE)
2. Tianji Yu (Developer)

Interviews will be approximately 1 hour in length and tape recorded. The report will include a description of Washington's environment for using and maintaining Vista.

## Appendix K: Multnomah County Case Study Evaluation Plan

### Discussion Issues

Introduction

What is your name, title and role?
What potential opportunities and drawbacks do you see to disseminating Vista?
What is your vision for Vista? What would you like to see in place?
What have you invested so far (in-kind, paid PHSKC, staff)?
What resources would be ideal and what would it take to do?
What hurtles have you faced, overcome, and still have ahead of you?
Describe the process to date of what has happened and who has been involved.

Infrastructure (updating the software, secure server, access to users)

What successes have you had in establishing infrastructure?
What challenges?
What users are you planning to disseminate to?
What support do you need?

Data and documentation (preparation)

What have been your needs around data?
What challenges have you had around making data available through Vista?
What plans do you have to support population data needs?
What support do you need?

Training and support (how to use Vista)

How do you plan to provide training in the use of Vista?
How do you plan to provide support for Vista?

## Appendix L: Washington State Security Model for Vista

**VistaPHw resides on two separate web servers**:

1. The VistaPHw interface and ***demo*** data are stored on a public website at www.vistaphw.net. The VistaPHw interface and ***demo*** data are accessible to the public.

The DOH data analyzed by VistaPHw are stored on a server within the DOH DMZ. All information transmitted to and from the DMZ is encrypted through SSL (Secure Socket Layer) hardware. The user ID and password are encrypted at the desktop interface before being sent to the server. Only individuals who meet the criteria delineated in the data sharing agreement (and who have signed this agreement) can access the DOH data on the VistaPHw server.

(This line represents the flow of Data to the DMZ, information is sent back in the reverse direction.)

This line represents a physical connection: